# ELECTRICAL REVIEW

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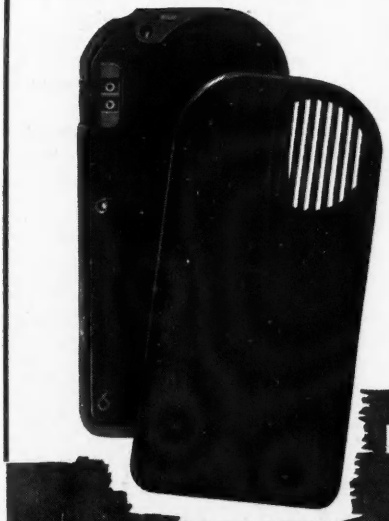

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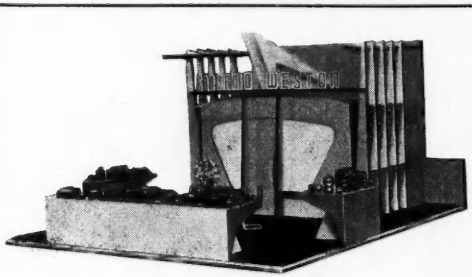

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER

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# Harmful Restrictions

## PURCHASE TAX AND "PRIORITIES"

THERE is considerable dissatisfaction, and in some quarters real concern, at the present position with regard to domestic electrical appliances. During the war both producers and potential buyers realized that other products must come first: the manufacturers turned over to the production of military requirements and the consumers continued to put up with less satisfactory alternatives or simply went without. The "authorities" were content and gave their blessing to the endeavours of the Electrical Development Association to arrest the snowball which it set going in palmier days.

### Too Long Continued

Unfortunately, the authorities are still content with the situation although the war ended about four years ago. They point out that shortage of generating plant and materials, the need for conserving coal for export, and the prevention of inflation justify the continuance of the damping-down methods introduced purely as war measures. It is true that restrictions upon the manufacture of domestic appliances have been reduced but some remain, and the Government is still keeping an eye on the ratio between production for home and export.

There persist two grave obstacles to free trade in these appliances—purchase tax and the "priority" system imposed by the Electricity Commissioners in 1947.

Purchase tax was introduced primarily to curb public expenditure or to divert it into "utility" channels with a view to encouraging saving. That is still the ostensible reason for its continuance, but actually it has been used for other policy purposes. The raising of the charge on space-heating appliances to 100 per cent was supposedly to save coal and discourage the purchase of appliances liable to be used only during power peak loads. If coal was saved it was power station coal useless for other purposes, and fairly good household coal was consumed instead. The peak load may have been alleviated, but this is not certain.

The same considerations were mistakenly applied to other electrical appliances—notably water heaters. Here again the coal saved (if any) was the wrong sort of coal, and there was no reason for believing that the heaters were used only at peak times. Moreover, suspicions of ulterior motives were engendered by the fact that while the tax on gas heaters (for both space and water) was reduced, that on electrical apparatus was maintained at 100 per cent.

### Let the Boards Decide

The other handicap to electrical development is the continuance in force of the Electricity Commissioners' ruling in February, 1947, that new or increased supplies should be given to non-industrial premises only if special reasons existed. The necessity for this is now very questionable and some relaxation, at the Electricity Boards' discretion, is essential.

These restrictions have had a serious effect upon the manufacturers of domes-

tic appliances (and their employees) and consequently upon export trade. It is axiomatic that production costs per unit are reduced as the number of units rises. If we are to meet foreign competition in overseas markets it is necessary to ensure a basic home market which will bear a substantial proportion of the overhead expenses.

The Electricity Boards are also deeply concerned in these matters. No less than the Chancellor of the Exchequer, they have to balance their budgets. They can do this by selling more electricity—if possible in off-peak hours—or by raising their prices, which must result in rapidly diminishing returns.

It is imperative that the Minister of Fuel and Power, who is responsible for the success of the nationalized electricity service, should first revise his views on "priorities" and, secondly, endeavour to persuade the Chancellor of the Exchequer to remove or reduce the inequitable and harmful purchase tax upon essential apparatus.

**CONTRACTORS' MEETING**

It was a wise decision of the Electrical Contractors' Association to revive its annual conference, the provisional programme of which is referred to in this issue. It is very desirable that contractors should "show the flag" at the present time. Indeed it is a pity that lack of assurance of support prevented the holding of a conference last year. Members should be well aware of the necessity of making themselves heard at a critical stage in the Association's history and turn up at Folkestone in full force. They have much to discuss and opportunities of meeting large numbers of their fellow members are rare.

**WORKS POWER STATIONS**

Since no possible economical power source should be neglected, greater use of surplus electricity from small private plants is to be expected. Former technical objections (unskilled synchronizing, for instance) to running such plant in parallel with the public supply are no longer valid, as last week's Institute of Fuel Conference revealed, though the rupturing capacity of circuit breakers may need attention. The main considerations are now commercial. The value to the B.E.A. of energy dumped on its mains at any time convenient to the small plant owner is only that of the coal saved. The kilowatts are of negligible worth compared with those the Authority has to provide as and when they are required.

**GAS "VESTED"**

On Sunday last the gas industry became vested in the National Gas Board; this marked the completion of Mr. Shinwell's "trilogy." In the past we have sometimes seemed to detect a slight preference for gas on the part of the Ministry of Fuel and Power. Now that the industry is nationalized will it still be regarded as a little more worthy of encouragement than electricity supply or will the two services be placed on a more level footing?

**BOILER ASH**

Power station engineers have from time to time over many years endeavoured to interest builders in the possibilities of steam boiler ash as a building material. They never got very far with their idea, but it now appears to have been taken up officially. Plans are in preparation for the erection of pilot plant at Twickenham to clean ash by pneumatic separation for making building blocks and clinker for use as aggregate in concrete, as part of the effort being made to modernize building methods which is sponsored by the Ministry of Works.

**BUILDERS' TOOLS**

Another recommendation in the same connection is that builders and civil engineering contractors should make use of more machinery, but manufacturers seem to have been unwilling to follow up ideas of this kind. The Ministry has therefore been advised to consider the granting of exclusive rights for a fixed period of years to commercial firms willing to manufacture improved machines, or develop new equipment. Apart from being motor driven in some cases, like the builder's hoist illustrated last week (p. 719), such aids are not likely to be predominantly electrical. More general use could, however, immediately be made of portable hand tools.

# Instrument Design

## *Apparatus Seen at the Physical Society's Exhibition*

By A. G. PEACOCK,
B.Sc., A.R.I.C., A.Inst.P.

THE recent annual exhibition of instruments and apparatus, organized by the Physical Society at the Imperial College, is a useful standpoint from which to review present-day trends in instrument design and manufacture.

In this exhibition commercial aspects are generally subordinated to research achievement and technical development. This follows from the original concept of the exhibition, which was to enable fellows of the Society annually to show each other the most interesting apparatus that they had developed in their laboratories in the past year. Since those early days the exhibition has somewhat changed its character for, in addition to the research exhibits, there is now considerable support from the trade. It must be said that the present blend of pure and applied science is a most happy one. The close link between the university and instrument makers afforded by the Physical Society's Exhibition has been an important feature of the industry in this country since its early days. Fifty years ago a scientific instrument was entirely the tool of the research worker, and his home was in the laboratory.

### From Laboratory to Industry

Perhaps the first scientist to take the scientific instrument from its traditional home and guide its industrial exploitation to the full was Lord Kelvin, who developed a special range of instruments specifically for cable testing in connection with the then projected transatlantic telegraph cable. Many other similar examples in the years that followed can be quoted and it may not be out of place to point out that perhaps the most important single instrument at present in the hands of the electrical technologist is the cathode-ray oscillograph, whose cathode-ray tube is a direct descendant of the original apparatus developed by J. J. Thomson to determine the e/m ratio for the electron.

The 1949 exhibition was notable for the many new designs shown. With the return of the competitive element in trading, much time and thought has been given to planning new and improved apparatus. New applications, too, are now to the fore and a large number of special instruments show that the manufacturers are mindful of the individual needs of their customers. Research work has resulted in the production of new and improved alloys and materials of all types. The patient work of the Council of Industrial Design and other bodies is now also bearing fruit and many of the instruments shown demonstrated the close attention that is now paid to the contours of apparatus and appearance of the cases generally.

### Meter Improvements

Most of the well-known meter manufacturers displayed redesigned instruments. In many of these, use was made of the new magnetic materials of high performance for both fixed and moving parts. Improved damping was also claimed by several manufacturers. Everett, Edgcumbe & Co. achieve this in their disc scale moving-coil movement by replacing the normal heavy ring magnet by five anisotropic cast magnet blocks in a star formation with outer and inner yokes made up from laminations. This instrument has a 240 deg scale and full deflection is attained without over-swing in one-third of a second.

Robust movements are embodied in many portable instruments and no fewer than eight firms showed multi-range test sets. Much ingenuity is displayed in the layout of these instruments, particularly in several of the very small types; for example, the "Minitest" shown by Salford Electrical Instruments, Ltd., which is fitted with a 1,000 ohms/volt movement. Among the full-size instruments those shown by Taylor Electrical Instruments, Ltd., have a sensitivity on both a.c. and d.c. voltage ranges of 20,000 ohms/volt.

Much attention has been given to the

design of special instruments for use under particularly arduous conditions, such as the vibration caused by diesel machinery. Special types for use in aircraft could be seen on the stand of Sangamo-Weston, Ltd., among which was a new two-element wattmeter designed chiefly for three-phase 400 c/s aircraft circuits.

"Tropicalization" continues to be a subject of interest to meter manufacturers. Ferranti, Ltd., called attention to the qualities of their latest ranges by boiling a complete instrument, which was arranged to deflect every few seconds for the whole period of the exhibition.

Two new instruments by Measuring Instruments (Pullin), Ltd., should have considerable use under special conditions. They are of the overload scale type and indicate the normal working current up to two-thirds of the scale. The top portion of the scale is suppressed to accommodate surge currents up to five times the normal running load.

## Load Conditions

Present-day difficulties with electricity supplies were reflected in the number of firms displaying apparatus for operating alarms when a certain predetermined kVA demand is exceeded. The Salford pattern is based on a contact ammeter design, while another instrument, by Nalder Bros. & Thompson, Ltd., is arranged to give a warning when the frequency of the a.c. supply falls below a certain value. This firm also showed an interesting new instrument in the "Vectormeter." This is remotely controlled and gives simultaneous readings of kW, kVAr, cos $\phi$ and amperes on a common dial. Their improved tap-position indicator with a circular scale should also be of interest, being independent of voltage and temperature variations and able to operate on a.c. or d.c. circuits.

In addition to normal instruments, much standard and substandard apparatus was displayed. The Cambridge Instrument Co.'s reflecting dynamometer wattmeter has a new optical system that gives the scale an effective length of two and a half metres, and the nominal range is 500 W. Considering electro-magnet instruments generally, it is pleasing to note that in this country the unrestrained use of electronics, whether or not they are most satisfactory for the problem in hand, seems to have been suppressed. A number of special electro-magnet instruments shown make full use of all possible arrangements and coils and magnet fields.

The battery charge indicator by Everett, Edgcumbe & Co. is based on the permanent-magnet moving-coil instrument with working coils in different magnetic fields. Unlike the true radiometer or ohmmeter, the torques of this meter are additive. The main coil operates as a voltmeter and the compensating coil is connected across a shunt in the main current path. This arrangement enables the instrument to read the battery e.m.f. (that is, terminal volts and IR drop in the battery) directly. The state of charge of a battery is proportional to its e.m.f. under normal load current and such an instrument is only suitable for one battery voltage and also for stated compensation current conditions. Such a meter is of great use to operators of electric vehicles.

Another instrument of use to certain specialized users is the mains resistance meter shown by the Baldwin Instrument Co. It measures not only the ohmic resistance, but also the inductive drop, which is not measured by an ohmmeter. This is achieved by a "balance" voltmeter, which measures the volt drop due to a known and self-contained load. Such a meter should be specially valuable to users of plant with large intermittent loads, for example, welding sets, where the volt drop due to mains resistance may be serious.

## Magnet Amplifier Applications

In the last few years, much attention has been directed towards applications of the magnet amplifier. These devices, which have enjoyed considerable vogue on the Continent for measuring or amplifying small voltages (d.c.) from such sources as photocells and thermocouples, can now be obtained from a number of British sources. They have the advantage of robustness and simplicity over the conventional d.c. vacuum tube amplifier. The use of this device as a photocell amplifier in the magnetic photometer was demonstrated by Electromethods, Ltd. A special type combining a sensitive d.c. valve amplifier

with magnetic modulation was shown by Ferranti, Ltd. Specially high stability and sensitivity are claimed for this combination.

As has already been stated, the main use of magnetic amplifiers comes from their ability to amplify d.c. or very low frequency a.c. inputs. Recent research at the laboratories of Mullard Electronic Products, Ltd., has led to the development of an instrument which will operate on audio-frequencies. A high carrier frequency of approximately 100 kc/s is employed and, in order that losses do not impose any stringent limitations on the frequency, Mullard "Ferroxcube" alloys are employed in the magnetic circuits. Several applications of magnetic amplifiers demonstrated by Elliott Bros. (London), Ltd., included industrial counting, thermocouple recording and the use of this apparatus in servo mechanisms.

### Illumination Instruments

Much apparatus of interest to those concerned with problems of illumination was on view. The Research Laboratories of the General Electric Co. showed several types of high-pressure mercury vapour discharge lamps. The continuous research and development which is carried out in this field by the G.E.C. is reflected in such special devices as a brightness comparator for fluorescent powders and apparatus for measuring the thickness and transmissions of the coatings. The effect of ambient humidity on the starting voltage of the low-pressure positive column discharge was also demonstrated. This voltage could be increased by as much as 50 per cent in conditions of high humidity. The relation between arc current and arc voltage in high current density discharges through inert gases was demonstrated by the Siemens Lamp Research Laboratory. A relatively simple construction dissipating only some 100 W has enabled further investigation of the electric characteristics of the gas arc to be made.

Many varied types of photometers for different applications were on view. Among them was the Holophane "Lumeter" developed by Wray (Optical Works), Ltd. This portable visual instrument has recently been redesigned and is used by lighting engineers for both internal and external lighting brightness measurements. Modifications have now been made to keep the instrument in line with recent developments in light sources and the need for measuring greater ranges of illumination. The interest of the development engineer in the properties of insulating materials is catered for by several manufacturers. Several new instruments developed by Gresham Transformers, Ltd., have many applications. Among them was a new portable insulation flash tester, operating between 500 and 2,500 V and incorporating a special device permitting full current to flow on breakdown for a sufficiently long period to enable the point of failure to be determined by "burning out."

Evershed & Vignoles showed their well-established "Megger" instruments in improved forms for measuring resistance and insulation generally. The highest range of the Series I instrument is now up to 5,000 megohms.

### Servo Mechanisms

Increasing industrial use of servo-mechanisms as position controllers in many applications has stimulated work on ancilliary test apparatus. Evershed & Vignoles exhibited an apparatus for checking the performance of a complete servo system. The electronic simulator on the stand of the Sperry Gyroscope Co. has been evolved to solve some of the many problems of the design of servo mechanisms. Any parameter of the complete system may be varied at will and the effect is at once apparent. The solution of the various problems fed to the apparatus is presented on the screen of a cathode-ray tube and a record may be obtained by tracing this from the face of the tube.

The mathematical approach needed in the design of this type of mechanism recalls the considerable amount of work at present being undertaken in this country on computing and calculating mechanisms generally. In this field, electrical and electronic methods of operation are well established. A new machine for solving simultaneous equations of up to twelve unknowns was shown by Elliott Bros. Since the machine forms sums of series of products, it may also be used for the multiplication of matrices.

Industrial precision control is another specialized field of technology wherein

electrical methods enjoy considerable vogue. In this type of instrument a parameter, such as temperature or pressure, is measured and used to operate an indicator or recorder and also to control some device to restore this quantity to some predetermined value. The advantage of changing the parameter to electrical potential which can so easily be amplified or modulated has attracted many designers.

A new instrument shown by the Foster Instrument Co. is electrical and has the advantage of continuous operation as opposed to the intermittent cycle of this company's other systems. A condenser formed between the control arm and the indicating pointer is part of an oscillating valve circuit. As the two pointers diverge, so the capacity changes, thus changing the anode current of the oscillating valve. If the pointer is driven from a thermocouple inserted in an electrically operated furnace, this change in an anode current can be used to control the energy input to the furnace.

George Kent, Ltd., have produced an electronic model of their "Multelec" instrument. It is much faster in operation and should have many applications. A convertor is employed to alternate the out-of-balance e.m.f., which is amplified to provide sufficient power to drive the slide wire and the indicating mechanism.

### Industrial Timers

Electrical operation is also popular for timers for all types of industrial purposes. They may be of the electronic type in which the time unit is obtained by discharging a condenser through a known resistance. An alternative method is based on the synchronous motor, as used by Everett, Edgcumbe, who also make a timer combining both the synchronous motor and electronic operation. In this way, an extremely long scale is obtained and the instrument will operate a contact after a pre-set time or provide a d.c. pulse of controllable amplitude from one millisecond upward.

In the last two decades there have been many fundamental improvements in electro-medical apparatus. Equipment developed by pioneers in this field was essentially of the empirical type and little was known of the mechanism of any effects or results obtained. Modern apparatus, is, however; based on factual knowledge and uncontrolled quantities and voltages are things of the past. In, for example, equipment designed to stimulate atrophied muscles voltage pulses of controlled amplitude and polarity and duration are given. Such apparatus was shown by the Edison Swan Electric Co. When used diagnostically, it will measure the chronaxie value of de-nervated muscles while automatically controlled pulses can be given for therapeutic purposes.

An example of a new mains-driven electro-cardiograph giving immediate and direct recording was a feature of the A. C. Cossor, Ltd., stand. The recording side of this instrument consists of a Hughes inkless single-pen recording unit writing in black on calibrated "Teledeltos" paper. A simple calibration system is incorporated.

### Recording Brain Potentials

A new Marconi electro-encephalograph incorporates a number of important improvements. The existence of potentials in the brain was discovered in 1874 by Caton in England, but it was not until 1930 when a suitable valve amplifier could be developed that a complete record of brain potentials could be obtained and their significance interpreted. The design of this amplifier and its auxiliary equipment is a problem of considerable technical magnitude. For example, the instrument should have a voltage gain of the order of $10^7$ and develop considerable power to operate a pen recorder. It must also be completely stable, have a very low noise level and a frequency response which must be constant to 0.5 c/s. The new instrument is very flexible in operation and, in addition to the six signal pens, two marking pens are provided. This enables brain potentials from six points to be recorded simultaneously, while one marker pen can be used for indicating time intervals and the other for identification purposes.

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## Post-Graduate Courses

Full-time post-graduate courses in electronics, electrical communications and power system analysis commence in October next at the Imperial College of Science and Technology. Particulars appear in our advertisement pages to-day.

# Factory Floodlighting

FLOODLIGHTING and neon signs are once again in use at the Brentford factory of the Firestone Tyre and Rubber Co., Ltd. All the floodlighting equipment at the factory was supplied by the General Electric Co., Ltd., and the neon lighting by Claude-General Neon Lights, Ltd. Much of it had been in use before the war, but sixty-eight additional 1,000 W floodlights have been installed. A three-colour effect is obtained from banks of white, red and blue lamps, in the main office block, while the façades of the other two buildings, at present illuminated with white floodlights, will also have colour installations shortly.

For the illumination of the main building there are forty-eight 1,000 W floodlights arranged in three banks of sixteen. The floodlighting of the new employment building is carried out by twenty-two 1,000 W units mounted 8ft from the façade. Fifteen Class B projector lamps illuminate the front of the employees' clubhouse. Two large "Firestone" signs are floodlit as is also the 200ft chimney, which is illuminated by two banks of six "Symmetric" type 1,000 W floodlights mounted on a building 35ft away.

The neon installations, in orange, consist of the name "Firestone" on the front of the main office block and the company's trade mark. Additional neon installations of the same trade mark sign are situated on the four sides of the company's water tower.

**G.E.C. floodlights at a Brentford factory**

# British Plastics Federation

ON 27th April the British Plastics Federation held its 14th annual luncheon at the Savoy Hotel, W.C.2. Mr. C. F. Merriam, chairman of the Federation, presided and proposed the health of the guests. Mr. Merriam referred to the presence at the luncheon of representatives of kindred associations in Denmark, Norway, Sweden and France, and, in this connection, said that it was generally supposed that people in other countries worked harder than we did in Great Britain. Whatever the truth of this was, it could be fairly claimed that during the war British men and women made records in production. It was still necessary for them to maintain that effort.

Plastics manufacturers had continued to learn more and more about their materials and were endeavouring to standardize and improve their products. The manufacturing capacity of the industry was still rising because, in spite of any temporary setback, they had faith in continued expansion. There was hardly an industry which they did not serve in some way. Where they had a free hand, plastics manufacturers strove to improve design; the work of the Council of Industrial Design was having effect. Too often, however, they were bound by customers' requirements. If allowed to develop freely the industry would make surprising progress.

Mr. Harry Nyström, president of the Swedish Plastics Federation, responding to the toast, said that the Swedish plastics industry was grateful to Great Britain for the advice and help received. He wished to see continued interchange of people between the two Federations. The Swedish plastics industry was begun in 1917 by two concerns; by 1939 40 companies were engaged in it, and now there were about 300 making finished and semi-finished products. Mr. Nyström gave a considerable amount of statistics relating to the Swedish industry and mentioned that Sweden was still dependent upon imports of raw materials, and Great Britain had become the principal supplier.

# *Views on the News*

**By REFLECTOR**

I SEE that new representations are being made to the Midlands Electricity Board by the Area Consultative Council regarding its decision to discontinue the supply of shilling slot meters. The wisdom of this decision was questioned in the *Electrical Review* at the time of its announcement. In spite of the general rise in wages since pre-war days it is still true that many people find it difficult to save enough to meet quarterly electricity bills and prefer to pay as they go. One strong point in favour of the retention of these meters is that the gas industry supplies prepayment meters and will have an additional "pull" if its rival discontinues them.

★ ★ ★

Because they were to be linked to a projected district heating scheme 890 Council houses at Wythenshaw, Manchester, were not provided with fire-back boilers. The scheme was postponed and the tenants have been using electric water heaters. Naturally the increase in the cost of electricity has hit them and they have secured the sympathy of the Manchester Corporation Housing Committee which was to ask the Council on Wednesday last to sanction the repayment of 1s a week of their rent as compensation. No doubt there are other people in Manchester—and all over Great Britain—who rely on electricity for water heating but who is to compensate them?

★ ★ ★

Electricity is also called in to meet a deficiency on an Easington (Durham) housing estate. It is reported that complaints about the operation of the coal cooking ranges installed have been general and it is therefore proposed to seek the sanction of the Ministry of Health to the provision of a combined electric griller and boiler in each house at a cost of £7 5s.

★ ★ ★

It is said that when Americans undertake projects they like them to be done in a big way. I recall, for instance, the pipe lines constructed during the war by the Government to convey oil across the United States from Texas and Louisiana to the Philadelphia and New York areas. The "Big Inch" line is 1,394 miles long and the "Little Big Inch" is 1,475 miles in length. Both have been converted by the Texas Eastern Transmission Corporation for moving natural gas at the rate of 500 million cu ft a day from the southwest to the eastern seaboard. Centrifugal compressors in 21 stations are driven by 107 electric motors of from 1,250 to 2,000 h.p. in size, which impose a maximum demand of 126,000 kW on nine electricity undertakings. The power consumption this year is estimated at 1,055,400,000 kWh.

★ ★ ★

I am still being pursued by the critic who unjustly took me to task for quoting a reference to the comparative costs of overhead and underground transmission lines. He calls upon me to state the difference for 230 V mains. This, of course, will vary considerably according to the conditions, but I am assured by a very reliable authority that, usually, underground cables cost twice as much as overhead lines in villages. The ratio is higher than before the war because the cost of cables has advanced at a greater rate than that of overhead construction. The difference is even more marked when it comes to service connections which may be four times as much for cables.

★ ★ ★

An article recently published in the *Journal* of the Coventry Chamber of Commerce points out that while private traders are generally against nationalization they often do not hesitate to employ nationalized services even where there is a "private enterprise" alternative. It quotes as an example the electrical installation activities of the Electricity Boards and says there is no monopoly here—private electrical contractors are carrying on as before:—

> "If the man who comes to read the meter at your home makes a gloomy comment about the state of your wiring or you have to apply for permission to install extra load at your works, there is no necessity to 'leave it all to them.' Give the work to your own electrical contractor."

# Correspondence

**Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents**

## National Trading v. Private Enterprise

WE are all concerned with the policy of Government trading in electrical, radio and now television merchandise, and I have followed closely the negotiations between the various private enterprise associations and the British Electricity Authority.

I appreciate the difficulties involved, but have waited twelve months in vain to see or hear of a practical suggestion put forward by the trade associations as a workable proposal to negotiate upon and with this in mind I put forward the suggestions below which I believe to be a working scheme for the sale of equipment to test the trade generally as to their reactions.

Retailers will agree that unless a concrete policy, equitable to all concerned, is worked out, we shall drift from the "cold war" of the moment into an open "civil trading war" to settle the issue. I have tested the reactions of various manufacturers, wholesalers, retailers, the public and Electricity Board representatives, which encourages me to put this in print for general consideration.

Here, then, is the proposal which could be reviewed and modified or added to as found necessary in practice every three years or so.

(1). All direct purchase and sale of equipment to the public over a certain value shall be suspended by the Electricity Boards.

(2). Manufacturers' agents and retailers shall supply equipment to the Boards for their showrooms or for sale to the public at 5 per cent commission on the gross value of the goods (by official order from the supply authority), irrespective of who the supplier may be, and credited upon connection to the supply mains.

(3). All apparatus to bear a label stating the supplier and manufacturer and bearing an approved and tested mark by the B.E.A.

This scheme would give the public, retailer, supply authority and manufacturer a square deal; employees would not be affected by the change; and the Electricity Boards could concentrate on their proper task as suppliers of electricity, with a 5 per cent commission for services rendered to the trade in general. Hire and credit coupled with free inspection of installation work and a continuation of supply service to domestic and industrial consumers could be financed from this fund which, taken nationally throughout the country would be an appreciable amount.

Without going further into details I submit that a plan of this nature is workable if the parties concerned are equally responsive to formulate and sign the agreement, and a stability would be brought about in the sale and installation of equipment the like of which we have not had previously, to the benefit of all and the public in particular.

*Old Hill, Staffs.*

A. E. CHAPMAN,
A. E. Chapman & Co. (Old Hill), Ltd.

## E.C.A. Conference

FOLKESTONE has been chosen as the scene of the first post-war Conference of the Electrical Contractors' Association which is being held from 29th June to 1st July inclusive. Traditional lines are being followed, judging by the provisional programme circulated to members. A meeting of the Council of the Association and its allied organizations, N.E.C.T.A., Ltd., and the National Federated Electrical Association, is to take place on the morning of the first day; registration will proceed throughout the day; and in the evening there will be a reception at the Hotel Metropole by the president, (Mr. J. G. Briggs, A.M.I.E.E.), followed by a dance.

On 30th June the Mayor of Folkestone will accord the delegates a civic welcome at the Leas Cliff Hall, and Mr. Briggs will deliver his presidential address. The session will be resumed during the afternoon and in the evening there will be a ball and supper at Leas Cliff Hall at the invitation of the Mayor.

The annual general meeting, at which there will be a general discussion on matters of interest to members, is to take place on the morning of 1st July. The new president will be installed and will give a short address. A garden party is being arranged and there will be a smoking concert and dance at the Hotel Metropole in the evening.

The conference fees will be £1 10s per person for members and their ladies and £3 per person for non-members and their ladies.

# Light-Alloy Conduit

## PRECAUTIONS TO BE OBSERVED IN USE

RESULTS are not yet available from long-term research that has been instituted into the properties and behaviour of conduit and fittings made of aluminium and zinc-base alloys for enclosing electric wiring. Meanwhile, for the guidance of users of these light-metal installation materials, a memorandum on the subject has been issued by the Institution of Electrical Engineers on behalf of its Wiring Regulations Committee.

It is mainly a warning about the liability, in damp situations, of corrosion occurring at junctions of dissimilar metals and at points of contact with other building materials. Thus all fittings, earthing clamps and fixings in contact with aluminium alloy tubing should be made of an alloy which is known to be suitable for association with the alloy of which the tubing is composed. The exclusion of moisture from such joints by greasing them during assembly and by applying bitumenized paint to the outside after assembly should retard corrosion.

Joints between aluminium alloy and copper, or alloys of a large copper content, should be avoided because they are particularly liable to corrode. For that reason brass fixing screws and saddles should not be used with aluminium or zinc-base alloy fittings.

The extent of corrosive attack in certain industrial and moist saline atmospheres, which is related to the composition of the alloy, can be minimized by protective paints if the coating is effectively maintained.

Contact with such materials as mortars, plasters, concretes, especially those containing Portland cement, may cause corrosion. Alloy tubing and its fittings should therefore be protected with bitumen applied hot, or two coats of good bitumen paint after pre-treatment, before they are embedded. Similar protection is needed for light-alloy conduit in contact with acid-containing woods such as oak, teak and chestnut; alternatively the wood should be covered with a layer of bituminous felt.

Since oxide films of high resistance form on all exposed surfaces of aluminium alloys, care is needed to secure adequate electrical continuity for earthing and periodic tests are advisable.

Aluminium and zinc-base alloys are not, in general, as mechanically strong as steel. They are, therefore, less able to withstand heavy loading and severe vibration. They are also more liable to tear when being threaded. Dies and taps should be sharp and well lubricated with a 50 per cent mixture of high grade mineral oil and paraffin. Soluble cutting oils that may cause an alkaline reaction should not be used.

# Gas Nationalization

## COSTS AND PRICES

THE vesting of the gas industry in twelve Area Boards on 1st May was heralded on Saturday last by the announcement of the issue of compensation stock at par. This is to bear interest at 3 per cent (as in the case of British Electricity Stock) but the redemption dates are 1990-95, against 1968-73 for Electricity Stock.

There are ten autonomous Gas Boards for England, one for Scotland and one for Wales. The chairmen of these Boards form the Gas Council of which Mr. A. E. Sylvester is chairman. In an article contributed to *The Times* of 30th April, Mr. Sylvester briefly set out the responsibilities and aims of the new organization. In this he said that the price of gas was now between 50 and 70 per cent above the 1938 figures which was very much below the increase in general price levels.

In considering whether the present prices could be maintained a number of complex factors had to be taken into account. Some of the thousand undertakings affected (742 company and 275 municipal) had been balancing their accounts by drawing upon reserves or had incurred deficits and this must lead to a number of local adjustments in price. The high capital costs of new and replacement plant must eventually be reflected in price increases.

It was unlikely that the operation of the new régime would lead to higher administrative costs. Nor, on the other hand, could substantial economies be made because there had been no extravagant administration in the past.

Referring to the possibility of achieving a common price level throughout an area, Mr. Sylvester said that this raised difficult questions of policy with which he could not deal in a short article.

# PERSONAL and SOCIAL

## News of Men and Women of the Industry

At the annual general meeting of the London Chamber of Commerce on 27th April, **Sir Frank Newson-Smith,** Bt., retired from the presidency, having served for the maximum period of three consecutive years, and **Sir Frank Horsfall Nixon,** K.C.M.G., C.B., was elected to succeed him. Sir Frank Nixon is chairman and managing director of John Brown & Thos. Firth (Overseas), Ltd., and director of John Brown & Co., Ltd., Firth Brown Steels, Ltd. (Canada), Hallminster Investments, Ltd., and Whitehall Electric Investments, Ltd. He has been Comptroller General of the Export Credits Guarantee Department and joint managing director of the United Kingdom Commercial Corporation.

**Mr. J. C. Milne,** A.M.I.E.E., M.Amer. I.E.E., has been appointed manager of the Switchgear and Rectifier Departments of the Electric Construction Co., Ltd., Wolverhampton. He received his early training with the Hackbridge Transformer Co., Ltd., the London Electric Railways, and the Hewittic Electric Co., Ltd. Joining the E.C.C. in 1934 as rectifier engineer, he became chief rectifying engineer in 1943. **Mr. A. D. Bates,** who has retired from the position of manager of the Switchgear Department, became a pupil-apprentice with the company in 1898, rising to the position of chief switch engineer in 1932 and manager of the department in 1942.

**Mr. J. D. Noble,** M.B.E., A.M.I.E.E., who becomes chief rectifier designer was trained at Faraday House and joined the E.C.C. as a pupil-apprentice in 1936. In 1938 he was appointed rectifier engineer and from 1939-1946 was with R.E.M.E.

**Mr. J. M. Boyd,** B.Sc., A.M.I.E.E., has been appointed chief switchgear designer to the Electric Construction Co. He was educated at Kilmarnock Academy and Glasgow University, and served in the Mechanical Transport Section of the R.A.S.C. from 1916 to 1919. He joined E.C.C. as a switch engineer in 1929.

**Mr. F. G. Furniss,** M.B.E., A.M.I.E.E., has been appointed sales engineer in charge of electro-deposition equipment. Educated at Oundle School and the Wolverhampton and Staffordshire Technical College, he became a pupil-apprentice with E.C.C. and was in the R.A.S.C. from 1939 to 1946.

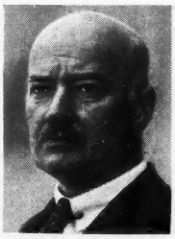
**Mr. E. N. Crosby** has recently been transferred from Wolverhampton to the London office of the E.C.C. to take up the position of technical sales engineer. He served his apprenticeship at the works, and has since been engaged on the design and layout of switchgear and contracts for industrial power and substation installations.

**Sir Graham Cunningham,** K.B.E., chairman and managing director of the Triplex Safety Glass Co., Ltd., has been appointed head of a department representing British industry which will work with the Board of Trade in its efforts to increase exports to Canada and the United States. His appointment will not be full time, and will not affect his industrial commitments.

**Lord Burghley,** K.C.M.G., was elected president at the annual general meeting of the Radio Industries Club on 26th April. The chairman and hon secretary for 1949-50 is **Mr. W. E. Miller** (*Wireless and Electrical Trader*). During the past year the Club collected £144 for the Electrical Industries' Benevolent Association and is also making a donation of 100 guineas from the proceeds of the Radio Industries Ball held last year.

**Mr. A. F. Aylen** has been appointed representative at the Brighton branch of W. T. Henley's Telegraph Works Co., Ltd., in succession to **Mr. O. S. Upton,** who left

**Mr. J. C. Milne**



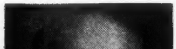
**Mr. J. M. Boyd**

**Mr. J. D. Noble**

**Mr. F. G. Furniss**

the company's service at the end of March. Mr. Aylen joined Henley's head office staff in 1919.

**Mr. H. W. Bosworth,** A.M.I.E.E., chairman of the Council of the British Electrical and Allied Manufacturers' Association for the ensuing year, is chairman and managing director of Lancashire Dynamo & Crypto, Ltd. He received his education at



Mr. H. W. Bosworth

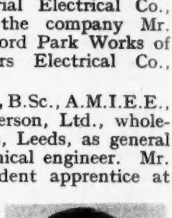
Mr. J. S. Ramsden

Worksop College, Leicester Technical College and the Manchester School of Technology. His association with the Lancashire Dynamo Co. commenced in 1904 when he joined the company as a college apprentice. He went to the company's Glasgow office as a technical engineer in 1907 and was transferred to London in 1909, becoming London manager in 1916. He was appointed sales director in 1921, joint managing director in 1930, managing director in 1936, and chairman and managing director in 1945. Mr. Bosworth is also a director of A. Roberts & Co., Ltd., Crypto, Ltd. (chairman), Crypton Equipment, Ltd., Dynamo & Motor Repairs, Ltd., Foster Transformers & Switchgear, Ltd., and the Nevelin Electric Co., Ltd. He was a member of a number of committees during the last war and has travelled in all parts of the world in promotion of overseas trade. He has been a member of the B.E.A.M.A. Council since 1940.

**Mr. J. S. Ramsden,** M.I.E.E., who has been elected vice-chairman of B.E.A.M.A., is sales director of the British Thomson-Houston Co., Ltd. He was educated at Bolton Grammar School and Bolton and Manchester Schools of Technology. From 1904 to 1907 he was with the British Westinghouse Co. at Trafford Park, and from 1908 to 1910 with Vickers, Ltd., Birmingham. In the last-mentioned year he joined the B.T.H. Co., Rugby, and in 1919 was appointed manager of the company's Birmingham office. He became manager of the Industrial Sales Department, Rugby, in 1924, and was appointed sales director in 1943. Mr. Ramsden has been a member of the B.E.A.M.A. Council since 1943. He was chairman of the Dynamo and Motor Association from 1930 to 1946 and has been president of the British Hard Metal Association since 1943. He is a director of Ferguson, Pailin, Ltd., and the Tool Metal Manufacturing Co., Ltd.

**Mr. L. Harris** has been appointed assistant manager of the Penryn, Cornwall, Branch of the Industrial Electrical Co., Ltd. Before joining the company Mr. Harris was at the Trafford Park Works of the Metropolitan-Vickers Electrical Co., Ltd.

**Mr. Norman S. Sellers,** B.Sc., A.M.I.E.E., has joined George Casperson, Ltd., wholesale electrical merchants, Leeds, as general manager and chief technical engineer. Mr. Sellers served as a student apprentice at the B.T.H. Rugby Works and obtained an honours degree in electrical engineering at Leeds University in 1940. He then joined the R.A.F., and after serving as group electrical officer in the Pathfinder Force he was appointed chief staff electrical officer at Bomber Command headquarters with the rank of wing commander. After the war he joined Briggs Collieries, Ltd., as mechanization officer, and in 1947 was appointed a sub-area electrical engineer in the North-Eastern Division of the National Coal Board, from which position he resigned to take up his present appointment.



Mr. N. S. Sellers

**Mr. K. B. Blake,** B.Sc.(Eng.), A.M.I.E.E., has been appointed sales and contracts manager of Nevelin Electric Co., Ltd., Purley Way, Croydon, and took up his duties as from 1st April. Mr. Blake joined the Metropolitan-Vickers Electrical Co., Ltd., as a college apprentice in 1930 and in 1939, having spent seven years in the London office, was transferred to Trafford Park to deal with Government contracts for the company's wartime products. In 1947 he was appointed assistant to the sales manager of the Industrial Control Department.

Mr. K. B. Blake

The annual dinner for employees of the **Industrial Electrical Co., Ltd.,** was held on

26th April at Bush House Restaurant, London, about 150 being present under the chairmanship of Mr. W. E. Lawton, managing director. This year is the silver jubilee of the company.

**Mr. L. H. A. Carr,** M.Sc.Tech., M.I.E.E., has been appointed a member of the Court of Governors of the Victoria University of Manchester, as a representative of Convocation. Mr. Carr is consulting engineer on the staff of the Metropolitan-Vickers Electrical Co., Ltd., and his duties principally cover patents and standardization. He is chairman of the Standardization Committee of the B.E.A.M.A. Council.

**Mr. K. S. Estlin** has resigned his duties as manager of the Plymouth sub-office of the Metropolitan-Vickers Electrical Co., Ltd., and is succeeded by **Mr. W. S. Livsey.** Mr. Livsey joined the Metropolitan-Vickers Electrical Co. in 1935 as a college apprentice after obtaining a London external B.Sc. (Eng.) degree. On completion of his college apprenticeship he joined the Industrial Control Sales Department, transferring to the Leeds sub-office in 1939. After service with the Royal Navy, during which time he was awarded the D.S.C., he rejoined the company in 1946, being first in transformer sales and then switchgear engineers. He returned to Leeds sub-office in October, 1947. **Mr. J. S. Hall** has been appointed manager, Swansea sub-office, in succession to the late Sir Arthur Whitten-Brown. He has been acting manager of the Swansea sub-office since last November.

**Mr. B. C. Bayley,** M.B.E., M.I.E.E., has just retired from the post of elctrical engineer to John Player & Sons, Nottingham, branch of the Imperial Tobacco Co. (of Great Britain & Ireland), Ltd., which he had held for the last twenty-one years. Mr. Bayley joined the British Thomson-Houston Co. at the age of eighteen and was for some years in their heavy plant section, Contract Department, Rugby. He served in the Royal Engineers during the 1914-18 war. He was chairman of the East Midland Sub-Centre of the Institution of Electrical Engineers in 1940-41.

**Mr. B. C. Bayley**

On 20th April, eight employees of the **British Electric Transformer Co., Ltd.,** Hayes, who had served with the company for forty years or more, were presented with inscribed half-hunter gold watches by Mr. R. Weaving, director, supported by Mr. E. T. R. Ball, general manager. At the ceremony in the works canteen Mr. Weaving mentioned that their aggregate service amounted to 353 years. On the same occasion gold wristlet watches were presented to four other employees in recognition of twenty-five years' service.

The General Electric Co., Ltd., announces the appointment to its board of directors of **Mr. A. S. Black,** manager of the Scottish branches of the company. Mr. Black joined the G.E.C. in Glasgow in 1910. After serving in the 1914-18 war he was appointed manager of the Edinburgh branch and in 1935 was transferred to Glasgow as assistant manager of the G.E.C. Scottish branches, becoming manager on the retirement of Mr. P. J. Sims in 1937. Mr. Black is a member of the Institute of Engineers and Shipbuilders, a fellow of the Sales Managers' Association and a past president of the Glasgow Publicity Club.

**Mr. A. S. Black**

The Midlands Electricity Board has announced twenty-seven new appointments in the Central Gloucestershire Sub-Area. Among these is **Mr. R. H. Cully,** A.M.I.E.E., who has been appointed technical and planning engineer. Mr. Cully was formerly chief assistant engineer to the West Gloucestershire Power Co., Ltd.

The staff and friends of **F. W. Brackett & Co., Ltd.,** engineers, Colchester, gathered at dinner at Colchester on 22nd April to join in congratulations to Mr. F. W. Brackett on the fiftieth anniversary of the foundation of the firm.

**Mr. M. L. Jamieson,** J.P., has resigned from the board of G. & J. Weir, Ltd., on medical advice.

**Mr. C. L. Tuck,** export manager since 1936 of Simplex Electric Co., Ltd., Birmingham, is relinquishing his position to become a director of Warden & Hotchkiss, Ltd., export merchants, of Birmingham.

**Mr. H. J. Troughton,** general manager and engineer of South Shields Corporation transport undertaking for twelve years, is leaving in June to become valuer with the British Road Transport Executive. He will be succeeded by **Mr. J. Crawford,** deputy general manager. Mr. Troughton commenced his career with the British Westinghouse Co., Manchester, and was later with the London County Council and the North Metropolitan Power Co. He joined the

Metropolitan Electric Tramway Co. and became chief mechanical engineer to the tramways controlled by the London Underground Railways. Mr. Troughton went to Greece in 1926 as Director of Transport and returned to England four years later. He then became chief engineer and deputy manager of Bradford Corporation transport undertaking.

At an inauguration meeting of the Gloucester Branch of the **Electrical Industries' Benevolent Association** on 27th April, Mr. W. Fletcher Cooper was appointed chairman, Mr. J. Newth, vice-chairman, Mr. K. W. Finch, honorary secretary, and Mr. I. S. Freemantle, honorary treasurer.

## Obituary

**Mr. F. H. Kingsnorth.** — The death occurred on 26th April at the age of forty-five of Mr. F. H. Kingsnorth, chief sales accountant of the General Electric Co., Ltd. Mr. Kingsnorth joined the G.E.C. in 1919 and was closely associated with Accounts Department throughout his career. After serving in the Statistical Department, Counting House and Bought Ledger Department at head office, he was transferred to Manchester in 1929 as branch sales accountant. Shortly after the beginning of the war he was recalled to London to give particular attention to Government accounts. On the retirement of Mr. S. F. Thomas in 1945 he was appointed chief sales accountant.

**Mr. C. E. Woodrow.**—The death has occurred, in his sixty-third year, of Mr. Charles Edgar Woodrow, for many years assistant sales manager of the Mechanical Department of the Metropolitan-Vickers Electrical Co., Ltd. Mr. Woodrow joined the company in 1904, being first associated with gas engines, but later with the commercial and sales activities of the Steam Turbine Department. Apart from a period in the company's Glasgow Office, he devoted the whole of his activities to that work. He was prominent in the trade organizations connected with the industry, being chairman of various committees over a long period.

**Mr. H. B. Barnes,** M.C., B.Eng.—The death occurred suddenly on 12th April, following an operation, of Mr. Herbert B. Barnes, representative of Belling & Co., Ltd., in the North-Western and Merseyside and North Wales areas. He had been with the company for fourteen years.

**Mr. R. E. Hattersley.**—The death occurred on 2nd May of Mr. R. E. Hattersley, suddenly, after a short illness. Mr. Hattersley was chairman of Erskine, Heap & Co., Ltd., and chairman and managing director of Hattersley (Ormskirk), Ltd.

## Wills

**Mr. S. T. Allen,** M.I.E.E., late district manager in Central England to the Central Electricity Board, left £17,395 gross £17,179 net).

**Mr. W. A. Randles,** assistant on mechanical design to the chief turbine engineer, British Thomson-Houston Co., Ltd., who died on 12th February last, left £8,313 gross (£8,264 net).

**Mr. L. S. Davis,** a personal assistant to the managing director of Babcock & Wilcox, Ltd., who died on 11th November last, intestate, left £6,631 gross (£5,846 net).

**Mr. J. Anderson,** M.I.E.E., who died on 18th December last, left £7,375 gross (£7,330 net).

## Electrical Reminiscences

SHORTLY before his death the late Mr. A. P. Trotter confided to the Institution of Electrical Engineers his personal reminiscences of his lifetime's association with the industry. These have been edited and abridged by Mr. F. W. Hewitt, a former assistant secretary of the Institution, and six typescript copies of the abridgement have been prepared and bound.

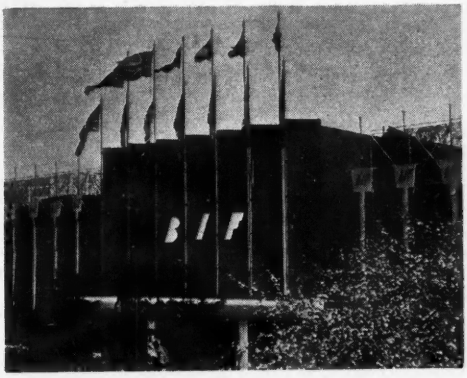
Copies have been presented to Mrs. A. P. Trotter, to the Science Library and to the Illuminating Engineering Society. A copy has been placed in the reference library of the Institution and another in the lending library is available to be lent to members on request.

The "Reminiscences" are of considerable interest and throw much light on the early legislative history of the electricity supply industry, both in the United Kingdom and South Africa.

## Resistance Thermometry

OPERATION of the platinum resistance thermometer depends on the relationship existing between resistance and temperature with pure platinum, as well as upon the stability and reproducibility of that metal. Data Sheet 2547, issued by Johnson, Matthey & Co., Ltd., 73/83, Hatton Garden, London, E.C.1, conveniently sets out the physical data relating to Thermopure platinum, together with the principal formulæ and methods of calculation used in determining temperature by means of the platinum resistance thermometer. During the preparation of this publication, account has been taken of the modified International Temperature Scale which became effective last January. A bibliography on platinum thermometry is also included.

# British Industries Fair




### EMPHASIS ON "DOLLAR" TRADE

DESPITE labour troubles at Castle Bromwich last week, most of the exhibitors at the British Industries Fair were ready for Monday's opening. This is the twenty-eighth of the series, and it is undoubtedly the most varied and well-arranged display yet staged.

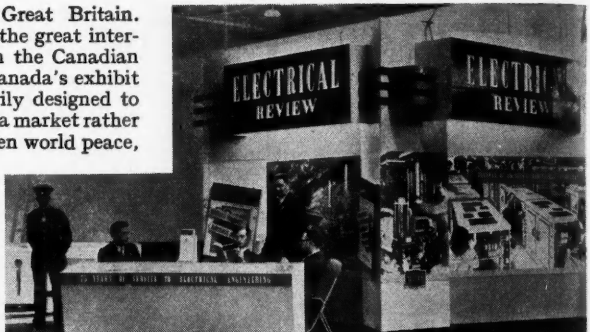
At Birmingham there are about 1,200 exhibitors, of whom, as we stated last week, 550 include on their stands items of electrical interest. There is also a good electrical representation at Olympia and Earls Court, London, though this is mainly of the lighter products. There is a particularly good display of instruments at Olympia.

**E.D.A. and Midlands Electricity Board Stand and (right) Marconi television demonstration at Castle Bromwich**

At the customary banquet at the Mansion House, London, Mr. Harold Wilson, President of the Board of Trade, presided. Mr. C. D. Howe, the Canadian Minister of Trade and Commerce, was the principal guest, and naturally the main topic of the speeches was trade between Great Britain and North America. In proposing the toast "Britain in World Trade," Mr. Howe said that Canada was endeavouring to bring trade with her principal customers — Great Britain and the United States—into better balance by expansion, not contraction. It was, he said, the basic policy of the Dominion to sell more to the United States

and buy more from Great Britain.

Mr. Howe welcomed the great interest now being taken in the Canadian market and said that Canada's exhibit at the Fair was primarily designed to demonstrate Canada as a market rather than as a supplier. Given world peace, there was little doubt that Canadian development in the future would surpass anything that had gone before. Canada was one of the largest import markets of the world, and offered unparalleled opportunities to the United Kingdom.

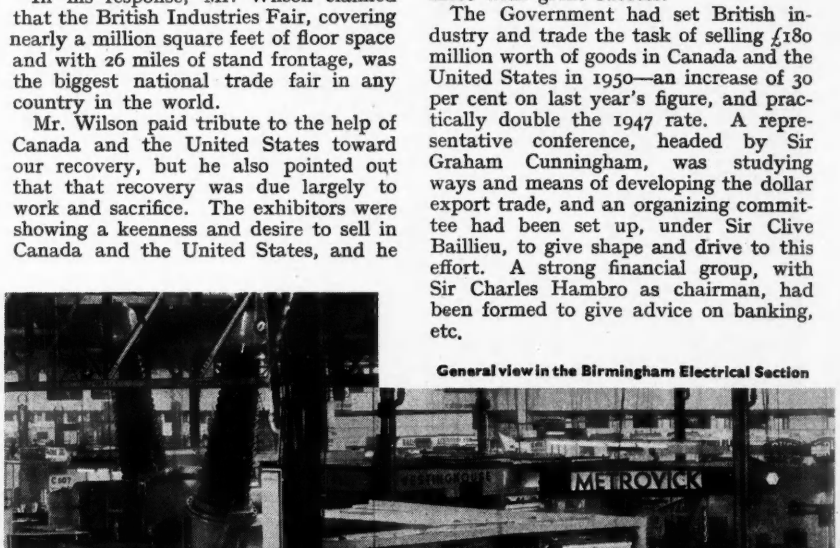



"Electrical Review" Stand (C.614)

In his response, Mr. Wilson claimed that the British Industries Fair, covering nearly a million square feet of floor space and with 26 miles of stand frontage, was the biggest national trade fair in any country in the world.

Mr. Wilson paid tribute to the help of Canada and the United States toward our recovery, but he also pointed out that that recovery was due largely to work and sacrifice. The exhibitors were showing a keenness and desire to sell in Canada and the United States, and he hoped that from the great number of buyers from those countries they would meet with great success.

The Government had set British industry and trade the task of selling £180 million worth of goods in Canada and the United States in 1950—an increase of 30 per cent on last year's figure, and practically double the 1947 rate. A representative conference, headed by Sir Graham Cunningham, was studying ways and means of developing the dollar export trade, and an organizing committee had been set up, under Sir Clive Baillieu, to give shape and drive to this effort. A strong financial group, with Sir Charles Hambro as chairman, had been formed to give advice on banking, etc.

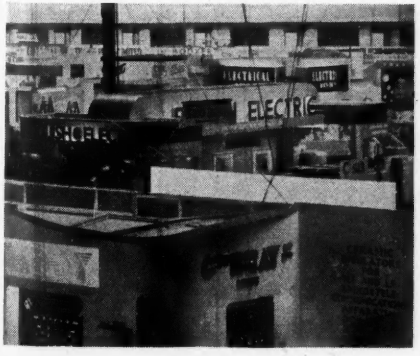


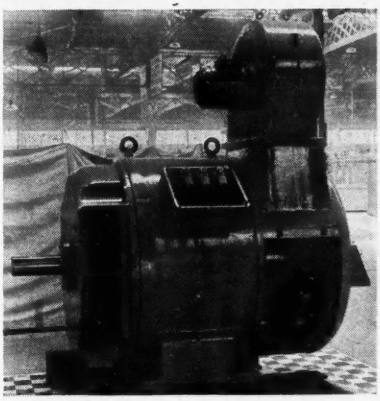

General view in the Birmingham Electrical Section

# Increasing Production

FOR nearly half a century, or ever since the electric drive "took the field" in industrial processing generally, the electrical industry has held the key to production increase, not only because the electric motor has continued to hold with increasing lead the front place in machinery driving, but also because the applications of most, if not all, inventions and industrial discoveries relating to processing have been made possible and advanced by the electrical contribution.

We emphasize the foregoing because it is the background to our present review, a background which has been factual for so long as to become commonplace and therefore not always readily appreciated. Because, no doubt, of present vital necessity to expand production we found ourselves automatically talking to exhibitors about their exhibits from this aspect to which we therefore tie our survey. True this method of review has certain limitations, because all, or most, electrical equipment has some bearing on the increase of production, and in saying this we refer particularly to those indirect indirect exhibits which relate more closely to the electricity supply industry, to which credit is equally due, such as the imposing 275kV oil-break circuit breaker shown by the British Thomson-Houston Co., Ltd. This "forecast" of future development in this country is 23ft high and almost touches the roof at Castle Bromwich. It was only after a few inspections that we were able to decide what was strangely familiar about this monster. The feature lies in the construction of the tanks. They are very squat horizontal cylinders, with domed ends, a principal of great strength, already adopted. It results in reduced oil content to the extent of 30 per cent by comparison with the vertical circular tank.



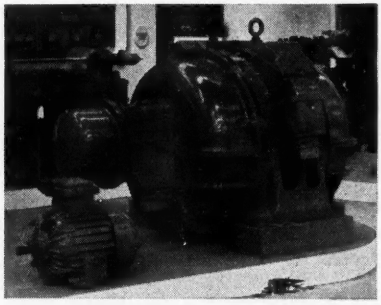


**The electric motor takes first place; Higgs Motors**

Another imposing exhibit with its application directly to electricity supply is the open-type 132 kV small-oil-volume circuit breaker shown by A. Reyrolle & Co., Ltd. It has a rupturing capacity of 2,500 MVA and is arranged for spring opening and pneumatic closing. For the last feature there is an integral compressor. It is a single-break equipment and has turbulator arc control.

Among other exhibits which relate directly to electricity supply are some shown by Ferranti, Ltd., the Brush Electrical Engineering Co., Ltd., and Ferguson Pailin, Ltd. The Ferranti exhibits include a 275 kV condenser bushing which is 17ft long and is an actual component and a 64 MVA transformer built for export; a full-size model of a 33/11 kV 20,000 kVA transformer in association with which there is fully automatic on-load tap-changing gear and a marshalling kiosk containing the control relays. The Brush exhibits referred to include a

20,000 kW turbine unit showing two discs with their axial-flow blades and one set of radial flow blades to demonstrate the contra-rotating principle of the Brush Ljungström turbine; and a 250 kVA 400 V, 750 r.p.m. alternator with a separate exciter suitable for belt driving from any type of prime mover. The



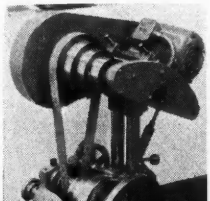
**For special-purpose work flame-proof motors are prominent; G.E.C.**

Ferguson Pailin units mentioned are a 33 kV metal-clad circuit-breaker with vertical isolation and horizontal draw-out (type V.L.P.10); and a type R.P.O. 31 outdoor 33 kV circuit-breaker with motor-wound spring closing mechanism.

To return to the direct contributions to general production increase we have in mind we must give the electric motor first place. It is difficult to make selections, but the large fan-cooled motor shown by Higgs Motors, Ltd., caught our eye particularly. It is a variable-speed a.c. commutator motor, rated at 600/160 h.p., 1,500/400 r.p.m. The separate motor-driven blower unit on the top provides a constant supply of cooling air irrespective of the motor speed. The speed is controlled by an induction voltage regulator which can be arranged for manual operation or by a pilot motor in the case of remote control. Applications are to paper making and printing machinery and to textile and rubber calenders, among others requiring precision speed control.

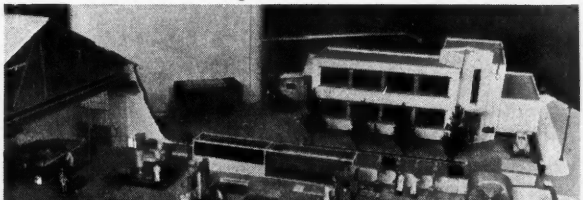
To refer to motors specially designed for a specific purpose we cannot do better perhaps than focus attention on the flame-proof motors displayed by the General Electric Co., Ltd. The large motor is a 200 h.p., 3,300 V, 485 r.p.m. equipment with a flame-proof slip-ring enclosure. Its principal application is for main haulage driving in collieries. The smaller 3 h.p., 440 V, 750 r.p.m. flame-proof squirrel-cage motor has a wider application, however, particularly to chemical works, petroleum refineries and explosives plants, in addition to coal mines.

Running efficiency should be of vital concern to all motor users, and perhaps the biggest contribution to this, apart from good maintenance, is power-factor correction. To get this idea home British Insulated Callender's Cables, Ltd., have an attractive working model of a general heavy-duty machine shop. It has individual correction for the motors driving a radial boring machine, a horizontal planing machine, a large lathe and a roll grinder, all approaching, say, 50 h.p.,



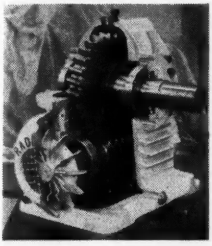
**Motor adaptability makes for greater production; Newman**

**Power factor correction contributes greatly to running efficiency; B. I. Callender's**

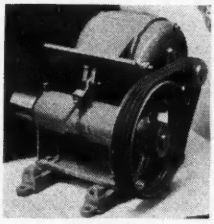


while all the smaller motors of up to about 5 h.p. are corrected as a group by a central capacitor which is automatically controlled by means of a suitable relay. Typical savings are indicated by three illuminated vertical columns showing amperes, kilowatts and power factor under different factory (model) operating conditions.

The adaptability of the motor is an ever-increasing contribution to greater production, and there is always something fresh. We point particularly to the "Powalastik" individual machine-tool driving unit which we saw on the stand of Newman Industries, Ltd. It is self-contained



The gear box is often something of a mystery; David Brown



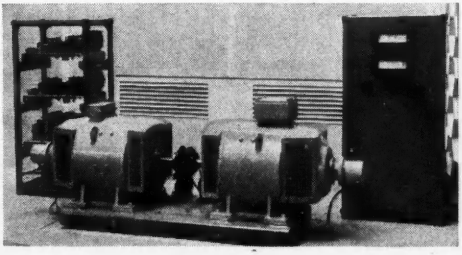
Installation problems are increasingly centred round power transmission; Brook Motors

with its driving motor of up to 5 h.p., a push-button contactor starter, an isolating switch and a four-speed change-belt transmission system with a special adjustable tensioning and damping scheme embodying hinged mounting of the driving unit and compression springs. We think the development should prove a great help in conversions, and some of the applications are wire-rolling machines, lathes and milling machines.

Factory installation problems are increasingly centred round power transmission schemes, and we were reminded of this by seeing the self-contained transmission unit on the stand of Brook Motors, Ltd. It represents a range covering drives from about 1 h.p. to 100 h.p. The model in question has a four-to-one speed-reduction ratio with transmission on to a countershaft. The motor is inclined away from the countershaft and a bolt hinged to the underside of the motor base plate engages a boss and a lock-nut on the countershaft housing, thus providing for tensioning.

The gear box is, of course, a mainstay in a host of transmission problems, but to many it is often a bit of a mystery. The "cut away" Radicon displayed by David Brown & Sons (Huddersfield), Ltd., is, therefore, informative. It is a fan-cooled unit very much like the externally cooled totally enclosed motor, the fan being cowled-in at the opposite end to the motor. The worm shaft runs in roller bearings. The motor-shaft to final-shaft speed ratio of the equipment on view is about 6 to 1, but this is only one of a wide range.

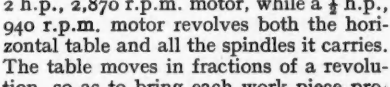
The keynote of many modern production schemes is precision speed control of the drives, and the Metropolitan-Vickers Electrical Co., Ltd., has brought this into the open by a demonstration exhibit. The object is to make two or more motors run in synchronism or at some predetermined relative speed with an accuracy of something better than 0.25 per cent without any mechanical coupling. This is achieved by means of a signal derived from a tachometer generator mounted on each motor, backing the signals so obtained and feeding the input into an electronic amplifier. The output of the amplifier controls a magnetic amplifier, i.e., a transductor, which excites the motor fields. A reminder that



The keynote to many production schemes is precision speed control; Metrovick

this scheme applies to speed control as distinct from position control—relative points on two conveyors, for instance—may be worth while.

Special motor applications are always coming—and staying—but we would like to mention a couple in the 1949 list. There is the new automatic rim polisher on the stand of W. Canning & Co., Ltd. It has eight spindle (work) heads and three mop heads. Each mop drive is a 2 h.p., 2,870 r.p.m. motor, while a ½ h.p., 940 r.p.m. motor revolves both the horizontal table and all the spindles it carries. The table moves in fractions of a revolution, so as to bring each work piece progressively under the three polishing mops —greasing, brushing and finishing. During each standing period of the table the spindles make 17 revolutions. All the



**This automatic rim polisher is another special motor application ; Canning**

motors are push-button operated from the front of the cabinet under the work and spindle table. Each spindle has a chuck for securing the work, and a few of the applications are to small cycle components, watch cases and gauge cases.

Secondly there is the "special" of Black & Decker, Ltd., i.e., the "electric valve shop," for dealing with automobile engine valves. It comprises three complete units: first, the valve master refacer for valve grinding; secondly, the "Vibro-Centric" kit for valve-seat grinding; and lastly, the carbon-removing kit for rapid decarbonizing. The machine wheels right up to the car, so that the servicing of the vehicle is done *in situ*.

In referring to the following examples of specific types of material handling equipment in their limited sense, we would not like it to be thought that we have overlooked the fact that this equipment can definitely be regarded as production plant, as well as auxiliary plant. A good example of special conveying schemes is the section of ash-handling plant shown by John Thompson (Wolverhampton), Ltd. It is a shortened, submerged ash conveyor system similar to the installations at the Deptford and Worcester power stations. In a water-filled trough with ball-valve control of the water level, the special rubber belt is shaped to the trough form by suitable rollers. The fact that the belt is water-borne results in particularly low running costs, and in view of this we have in mind other schemes not requiring cooling, despite the heavy capital costs brought about by the troughing. The actual delivery into the trough takes place at below water level, thus avoiding loss of efficiency as the result of cold draughts.

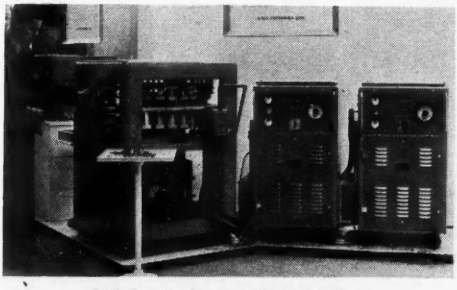
The battery truck is invaluable in factory handling schemes, an example being the "Graiseley" truck shown by Diamond Motors (Wolverhampton), Ltd. It is a pedestrian-controlled vehicle particularly suitable for transporting light assemblies to and fro in the factory, castings from the foundry to the machine or heat-treatment shops, and small ingots for die casting. The power and steering unit is self-contained with a 1 h.p. motor and centrifugal clutch, a double reduction gear box and, finally, chain transmission down to the steering and power front wheel. Then there is the works hoist.

**A good example of special conveying schemes is ash handling plant ; John Thompson**

The point, we think, about the hoist shown by C. E. Reed & Co., Ltd., lifting a five-ton block of concrete, is the very

small motor in relationship to the high load, consequent on the high-ratio reduction of the power transmission scheme.

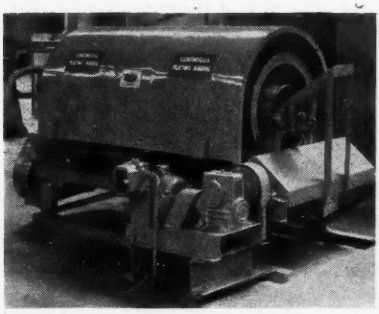
Two years ago high-frequency heating was "splashed" across the Fair Electrical Section as something of a novelty. It was certainly the biggest industrial development since 1939. To-day it is well established and almost commonplace. But its development continues, and an example of the most modern practice is the soft soldering equipment of E.M.I. Factories, Ltd., which we saw demonstrating the soldering together of the ends, flint tube and central body in each case of cigarette lighters. There are 30 heads on a horizontally revolving table. The heads are each on a cylinder and piston unit, and for the loading station they travel up a ramp until the assemblies are clamped between the heads and a circular top member over the table. Air at 160 lb per sq in. is applied to the piston and the tops and bottoms of



**H.f. development continues ; E.M.I.**

the assemblies are sandwiched between the "runs" of separate inductors ready for the h.f. application. Each inductor is served by its own 1 kW h.f. generator. Thus there is independent control of the top and bottom seams. Just before they leave the inductors the assemblies are temporarily released for "squaring up." Then they are clamped again, and they pass round for ejection on to a conveyor or other receiving equipment.

Continuous plating plant such as that shown by the Electric Furnace Co., Ltd., is always a good example of flow production. It is a continuous oscillating barrel for zinc, cadmium, tin, copper and other



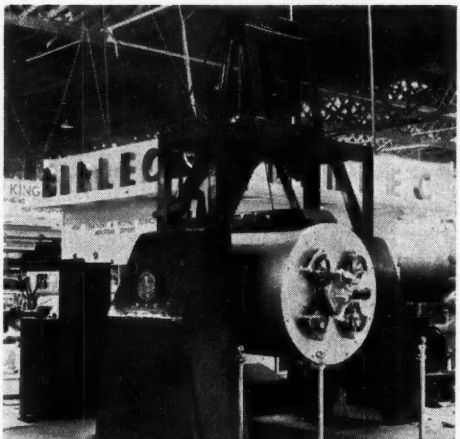
**Continuous plating is always a good example of flow production ; Efco**

depositions. Oscillation of the barrel is brought about by surface contact with two transmission pulleys, one on each side of the barrel, which make contact with the drum alternately. There are spirals along the inside of the barrel, and the oscillations are unequal and so arranged that the work is passed forward from spiral to spiral. A central bar supporting the anodes changes its disposition by a rolling movement with the change of direction of the barrel. The barrel shell is solid rubber, and studs through this contact cathode bars which finally connect with cathode rings round the ends of the barrel. An example of performance is 0.003 in. zinc deposit on 1 to 1½ in. screws at the rate of 300 per hour.

As a contrast to this there is batch production as indicated by the rotary drum batch carburizing furnace displayed by Birlec, Ltd. The drum is mounted on trunnions and rotated at a suitable speed. Carburizing gas is introduced through a glanded inlet at the back of the furnace, and the outlet is through a bung. Uniformity of case depth is ensured by the movement of the work, and the absence of a charge carrier shortens heating-up time and results in high thermal efficiency. A "refinement" provides for the remote control of the whole sequence of operations in the carburizing cycle, and the resulting labour reduction is such that at one plant, we were told, a single operator is handling three furnaces on a 2½-hour carburizing cycle. The main applications are treating light

components such as links, rollers, collars and washers, and heavier parts such as bearing races and rollers, gudgeon pins and other articles with fairly heavy grinding allowances.

Another electric-furnace development for speeding up production is the continuous flash annealing furnace shown

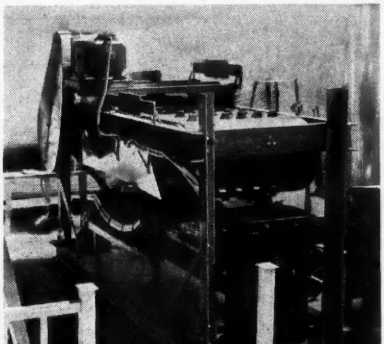


**A good example of batch production plant is the rotary drum carbonizing furnace ; Birlec**

pictorially by Wild-Barfield Electric Furnaces, Ltd. It is designed for the heat treatment of aluminium discs and sheets for the production of pressings such as saucepans. It utilizes the principle of superheating, i.e., the temperature of the furnace is considerably higher than the temperature of the charge, but the latter is passed through the plant too quickly to become overheated; thus the production is increased. The rate of production is one ton per hour, and the electrical loading is 220 kW. The charge is passed through the furnace on a wire-rope conveyor, and there is forced-air cooling at the exit end. Forced-air circulation is also provided through the furnace contra flow to the passages of the charge.

There is always a production speed-up welding story, and the discovery this time is the stud welding plant shown by Crompton Parkinson, Ltd. It has applications in the production of steel-tube furniture and canteen equipment, and in constructional engineering, boiler making and shipbuilding. A big economy factor lies in the speed of operation of the tool, and 14 studs can be welded in the time taken to tap and drill for one stud. It is a pure shielded arc-welding process. The equipment consists essentially of two parts—the welding gun and the timing unit. The latter is simply a high-speed welding contactor operated by relays. The equipment will run from any available d.c. supply, and the diameter of the studs is limited only by the amount of welding current available.

Magnetic separation has much to offer general production, and we refer particularly to the "Boxman" overband magnetic separator shown by Electromagnets, Ltd., Some of its industrial applications are in coal mining and quarrying for the removal of ferrous material being conveyed with the product to crushing plant. It consists essentially of a short continuous conveyor which operates across the product conveyor. The belt is fitted with feelers which become magnetized when they pass through the field generated by stationary electrode magnets. The feelers carry the picked-up material well away from the product conveyor. A single push-button control serves for both the motor and the magnetic system.



**Magnetic separation has many uses ; Electromagnets**

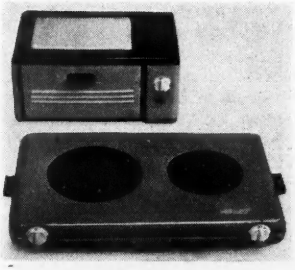
# Apparatus for the Home

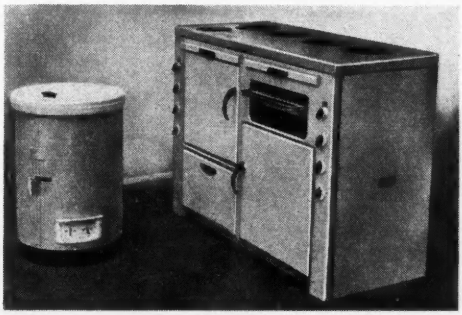
VISITORS going to the British Industries Fair expecting to see a lot of domestic electrical appliances of brand new design will, at any rate so far as the most commonly used apparatus is concerned, perhaps be somewhat disappointed. What they will see, however, are the final designs of many of the appliances which have made their appearance since the war. This state of affairs was only to be expected. In 1947 and 1948 manufacturers were only just getting into their stride with the production of their post-war models and had had little opportunity of benefiting from an exhaustive study of consumers' reactions. In practically every piece of apparatus to be seen at the Fair this year, however, the influence of practical as well as manufacturing experience is reflected in the additional refinements incorporated.

This is especially apparent in the case of cookers. Apart from a few special export models and table cookers, there is not, we believe, a single really new domestic unit to be seen: on the other hand it is equally true to say that there is not a cooker which does not show some, albeit small, improvement. In the Jackson series, for instance, the 192J, 193J and 194J, are all available with heated drawers and their appearance has been improved by the use of U-type instead of slug handles on the oven and hotcupboard. A greater variety of colours is now available too. Green is an alternative to mottled grey as a standard finish, while two-tone ivory can be had at a slight extra cost. Belling cookers, notable especially for their inner glass oven doors and automatically illuminated ovens, are also offered in cream finish in addition to the standard white.

**Display of Jackson "Giant" cookers with (left one mounted on a new stand**

To secure greater robustness, especially with a view to rough handling when being shipped abroad, the "Creda" E.V.13 model is now made with a one-piece cast front frame and one-piece pressed steel side panels. This cooker, with separately heated warming drawer, is now obtainable for the home as well as the export market in white finish as an alternative

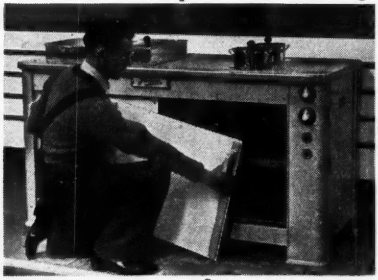




**Revo "Chef" breakfast cooker and double boiling ring and (right) "Creda" wash boiler and restaurant range**

to grey and two-tone ivory. A new, larger model with extra big oven and three hotplates has been added to the two existing standard English Electric models. The G.E.C.'s post-war model, the D.C. 113, with drop-down oven door, appears in both home (green) and export (white) finishes, together with a modern version of an old favourite, the 438E, available in mottled grey or cream and green. The Moffat 43S cooker has been adapted to conform to E.D.A. standards of interchangeability.

Larger models of the Revo "Princess" cooker introduced last year are now available for the bigger family. They have spacious hotcupboards and all models can be supplied with either a heated drawer at the base or a flush plinth. The Revo



**Jackson 5 ft hotcupboard with special stainless steel top, showing easy removal of doors**

"Duchess," which also makes its debut, has been specially designed to meet the requirements of certain export markets: it has drop-down oven doors and is available with a variety of different hob arrangements. Another special export model, the Parnall E.C.10, shows many improvements on the original unit shown for the first time last year. It can now be supplied with a heated or unheated drawer at the base, the top and bottom tubular oven elements are interchangeable, and a self-coloured hob is available as well as black.

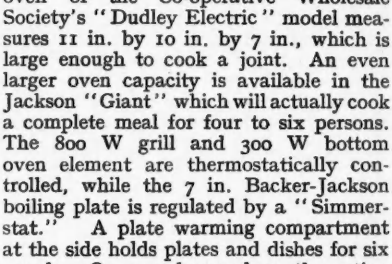
A two-stage thermostat which controls the top and bottom oven elements of the Parnall cookers is demonstrated by an exhibit inside the stand. This incorporates a system of gongs and provides Castle Bromwich with one of those distinctive noises which each year capture the attention of the visitor. Incidentally it is now more or less taken for granted by all manufacturers that ovens of stan-

**Bulpitt "Swan Brand" combined kettle and saucepan, 6 pint copper kettle and 3 pint electro-plated kettle for presentation purposes**

dard cookers shall be fitted with thermostats and that at least one hotplate, and perhaps even the grill-boiler too, shall have a "Simmerstat."

Several new table cookers make their first appearance. The Revo "Chef" model has a cream body with black hob, the 2.2 kW grill-boiler being metal sprayed to make it rust-resisting. The oven of the Co-operative Wholesale Society's "Dudley Electric" model measures 11 in. by 10 in. by 7 in., which is large enough to cook a joint. An even larger oven capacity is available in the Jackson "Giant" which will actually cook a complete meal for four to six persons. The 800 W grill and 300 W bottom oven element are thermostatically controlled, while the 7 in. Backer-Jackson boiling plate is regulated by a "Simmerstat." A plate warming compartment at the side holds plates and dishes for six people. Overseas buyers have the option of white instead of cream finish. A stand just brought out for this cooker includes

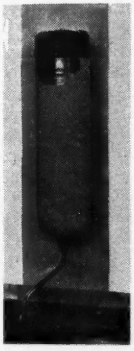
**New range of tea urns and an adjustable reflector fire (W. T. French & Co.)**



a hob cover which can also be fitted underneath for use as a pot tray. Another large capacity cooker for use in houses and flats in which space is at a premium, is the modernized version of the G.E.C. "Bungalow" unit, which has a bottom oven element as well as a grill-boiler: this cooker also has a hotcupboard at one side.

Among heavy-duty equipment the "Creda" restaurant range has been re-

**"Hotway Hotentot" instantaneous water heater (Campbell Engg. Co.) and (below) Thorn "Mary Ann" mixing machine**



designed to give the now standard height of 36 in. Known as model 2899, it conforms to E.D.A. standards of interchangeability and has the fuses conveniently located in the top under the hob-plate. One large and one small oven are provided, together with a warmed plate drawer. There are "Simmerstats" on all the five hotplates. Another "Creda" product is a new glass combined hotcupboard and display counter intended for use by railways, multiple caterers, etc. It is constructed of anodized aluminium and plate glass and is thermostatically controlled, a pilot lamp indicating when the apparatus is switched on.

Additions to the range of Jackson heavy-duty cooking equipment are 5 ft and 6 ft stainless hotcupboards with bains-marie or other special tops. For use particularly in holiday camps and the like Jacksons have also brought out a 120-plate electrically heated food trolley with steel frame and aluminium shelves. The L. G. Hawkins "Electric Hostess" food servers have been modernized and now include a new sideboard model for the smaller household.

An attractive double boiling table with one 6 in. and one 8 in. hotplates separately controlled by three-heat switches, makes its appearance on the Revo stand. It is finished in a pleasing green and a drip tray is provided. A new Revo twin boiling plate with white body, black hob and red "Simmerstats" has two 6in rings.

W. T. French & Son, who, by the way, are busily engaged in studying the requirements of the Canadian market, are introducing a number of new boiling devices. A complete range of tea urns is fitted with two separate 1,250 W elements to give initial quick boiling and to keep the tea hot when brewed. Two heats are similarly provided in a new coffee percolator available either in polished copper or chromium plated finish. Its 500 W immersion type element is fitted with a safety device. A new shaped 3-pint kettle loaded at 1,250 W and finished in nickel plate is designed to give quick pouring. Special features of the design of a new kettle by Gillott Electro-Steam Cookers are that the steam can come out only at the front and that the lid will not fall off when pouring.

What we believe is the first fully automatic coffee maker manufactured in this country appears on the stand of Falk, Stadelmann & Co. This "Raydex Auto-

**The Fisher "Cleanette"**

Perc" unit stops percolating when the coffee is ready and then keeps it hot until required. The same company also has on view a new 4-pint kettle of modern appearance. A presentation model electroplated 3-pint kettle selling at 15 guineas is a striking new "Swan Brand" product of Bulpitt & Sons, who are also introducing a 6-pint kettle in copper; the "Mayfair" coffee set with a chromium percolator, sugar and cream jugs and a black anodized aluminium tray; and a combined kettle and saucepan. The last-mentioned item, besides boiling water, can simultaneously be used for cooking eggs, porridge, etc.: its novel handle drops down sideways when not in use but locks in an upright position when lifted. An improved tap, which gives any desired flow, is a feature of the company's latest urns. New ground-base utensils for use specially on electric hotplates include a coffee percolator, an 8-pint kettle and a larger sized steam cooker. "Bakelite" straps have now been substituted for knobs on the lids of all models.

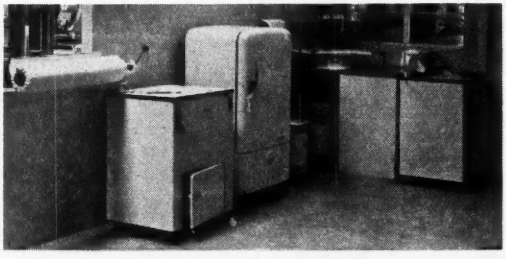
Food mixing machines are now appearing on the market in great profusion. The new Thorn "Mary Ann" machine, apart from mixing, whipping, etc., can, when lifted off its stand, be used for mashing potatoes, etc. It is designed to run at various speeds according to the thickness of the mix, and a simple device cuts off the electricity when the mixing paddles are being inserted or removed.

A more ambitious appliance with many additional applications called the "Cleanette" appears on the stand of H. Fisher (Oldham). With the aid of various attachments and a flexible shaft (all housed when not in use in a cabinet provided) it is possible to mince meat, grind coffee, slice and shred vegetables, peel potatoes, slice bread, squeeze lemons and oranges, sharpen knives, cool air by means of a fan, clean pots and pans, polish metalwork, polish shoes and furniture, apply vibro massage, dry hair, operate a drill, spray paint, etc. Further attachments for washing and drying the "smalls," dish washing, can opening and can sealing will also be available shortly. An electric clock is incorporated in the cabinet as a standard fitting.

Electric clocks of all types can be seen on the stands of Smith's English Clocks, the British Vacuum Cleaner & Engineering Co., T. M. C. Harwell (Sales) and others. New Ferranti electric clocks are shown side by side with the current range of large and small clocks in wood cases, in plastics and in glass, chromium and coloured "Perspex."

Though water heaters of the thermal storage circulator and immersion types are well represented on the stands of Ferranti, Aidas Electric, Berry's Electric, the Simplex Electric Co., the English Electric Co. and others, no important alterations in design are apparent, except that most of the Aidas "Sadia" storage heaters can now be supplied with built-in cold water cisterns. An instantaneous water heater with a loading of only 3 kW is, however, of special interest on the Campbell Engineering Company's stand. This compact "Hotway Hotentot" unit, measuring only about 16 in. high by 4½ in. in diameter, gives a pint of boiling water in 75 seconds and a gallon at 135° F in five minutes.

Various modifications have been made to a number of wash boilers. The Jackson model, for instance, is now fitted with a table top, while the Burco E.840 model now has a circular lid which opens automatically when the catch is touched. A new "Creda" wash boiler with two-heat control has a grey synthetic stove enamelled body with anodized aluminium lid and hot-tinned copper interior.



**Special display of Hotpoint home laundry equipment**

The only electric washing machine new since last year is the British Vacuum Cleaner & Engineering Company's "Goblin" unit, taking about 5 lb of dry clothes and incorporating a hand wringer.

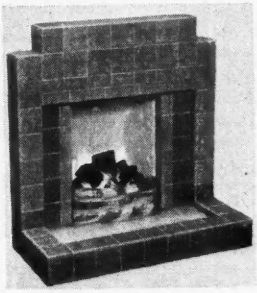
Unlike the other small washer introduced last year, the Hoover unit which incorporates an impellor, the "Goblin" machine has a conventional type of agitator. The English Electric "Ritemp" model is now fitted with a pump as is also the Wilkins & Mitchell "Servis" model, other new features of which are a completely sealed gear box, a plastic agitator and a 1½ kW heating element if desired. Incidentally this "Servis" machine can be adapted for petrol-engine drive for use in districts where electricity is not yet available.

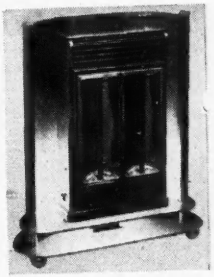
Lion Stamping Co.'s "Mayfair" combined radiator and convection heater

Still fewer maintenance difficulties are ensured by the substitution of Bowden cable instead of solenoid operated controls on the Thor "Automagic" machines, which are also now provided with vitreous enamelled tops. Sixty per cent of these machines, we were told, are now supplied complete with dish-washing attachment. The Bendix machine is still the only completely automatic machine offered. Apart from a "Perspex" demonstration model washing machine, the Hotpoint Electric Appliance Company's display includes a special home laundry section where can be seen in appropriate surroundings the company's whole range of appliances, including washing machines, rotary and flat plate type ironers and clothes dryers.

A compact new Belling drying cabinet 21 in. wide by 36 in. high by 14½ in. deep should find favour in flats, etc. It is made of sheet aluminium finished in glossy synthetic white enamel. A rustless guard over the 1 kW elements prevents any possibility of rust or corrosion, and a pilot lamp is incorporated. A larger model double the height and with a 2 kW loading (three heat) is also available. For those who object to screwing towel rails into walls, perhaps through tiles, Belling now supply their model with pedestal mounting. Two new drying cabinets are shown by H. Fisher (Oldham). The larger, which can also be used as a convector heater, has special compartments for holding an iron and ironing board when not in use. The other model, intended primarily for drying babies' napkins and other small articles of clothing, has other applications in doctors' and dentists' surgeries, etc., for drying towels.

Premier "Hystan" coal effect unit for use in grates during the summer and (right) Berry's Electric "Rayvector" combined reflector and convector fire





A new thermostatically controlled Bulpitt iron is claimed to be the only one on the market in which it is possible to obtain access to all components merely by removing the handle. The wire-wound element in insulating powder is embedded in the soleplate casting itself.

Among space-heating appliances probably the most interesting development is the production of a number of combined convectors and radiators. In the Berry's Electric "Rayvector," an attractive new addition to the "Haloberry" illuminated series, the direct radiation of two 1 kW elements arranged in vertical reflectors combine with the convected heat from a 750 W convector behind. A different method of achieving the same result is adopted in the "Mayfair" fire made by the Lion Stamping Company. This unit

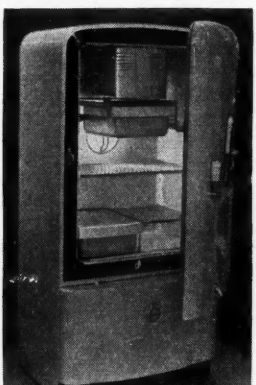
is double-sided, with a 1 kW element on either side fitted into a fixed curved reflector. At the bottom of these fixed reflectors is hinged a smaller reflector. When the lower reflector is open the heater operates in the normal way, but when it is closed, air is drawn through the bottom of the heater, past the heating elements and out of a grille at the top of the casing. A three-position switch enables 1 kW or 2 kW of red heat or 1 kW of black heat to be used. A further feature is the provision, underneath the top lid of the case, of a drying or airing compartment which is of great value in the nursery or sickroom.

Apart from the "Wilton" imitation coal fire as presented to Princess Elizabeth, Berry's Electric show a full range of imitation coal and log fires specially designed for the American market, including several models for decorative effect only with no heating elements. Also for visual effect only are the new Premier Electric Company's "Hystan" imitation coal units for fitting into grates during the summer months. Other new items in the "Hystan" range are a series of period imitation coal fires in natural steel finish.

Among the more utilitarian type of fires, a 1 kW reflector unit by W. T. French & Co. is striking on account of its great simplicity. A neat little bracket in cream or green, besides holding the reflector in any desired position horizontally, also permits wall mounting if desired. The provision of chromium-plated strips adds a neat touch to a new 2 kW screen fire by Ingram, Kemp & Joyner. The new Bratt Colbran "Solectra High Level" bathroom heater has a non-rust adjustable reflector and is designed for remote control.

Of special interest is a demonstration of the Ferranti method of high temperature low level radiant heating which has been designed particularly for schools and nurseries. In a model classroom the advantages of this special radiant method are forcibly indicated, technical details, written in fluorescent "chalk" on the blackboard, standing out strongly in the rays of concealed "black" ultra-violet lamps.

Owners of small kitchens will be glad to learn that the Pressed Steel Company is now supplying its "Prestcold" B.311 refrigerator for building into kitchen cabinets, etc. It has a capacity of 3.1 cu ft and occupies a space 36 in. high, 21½ in. wide, and 24 in. deep. For export only at present, the same company has just brought out a 7.7 cu ft model, the S.771, special features of which are the meat keeper, cold cooker, "crispators," and vegetable storage compartments. Also for export only, the English Electric Company is fitting its 6.4 cu ft model with a meat keeper, humid drawer and door lock if desired: the hermetically seated compressor unit carries a five-year guarantee. Typical of Electrolux absorption type refrigerators is the latest 4.6 cu ft unit.



**English Electric refrigerator with latest improvements**

Easier emptying, an improved light and a more convenient tool container are features of the new Hoover 612 vacuum cleaner. An improvement in the fan and motor design gives the Electrolux Z.55 unit greater suction, while manipulation is facilitated by the introduction of a rotary end-piece and an improved flexible hose. Truvox polishing machines are now available for the home market as well as for overseas. They are made in both domestic and industrial types and a novel feature is that when the handles are in an upright position the motor drive is automatically de-clutched. Special fan cooling arrangements ensure that the industrial model remains cool even in continuous use.

With the availability of the smaller lengths of tubes a greatly increased use of fluorescent lighting in the home is to be

expected. An attractive unit specially designed to accommodate two 2 ft 40 W tubes has been produced by Falk, Stadelman & Co. under the name "Derwent"; it has brightly coloured raised bands on a translucent white opal "Perspex" dish. For tungsten lamps Berry's Electric, who now produce all their own glassware, have several striking new additions to their range of fittings, including three-light bowls in antique brass, a four-light plate-glass ceiling fitting, two-light ceiling and pendant units and a lantern in antique brass. Floor standards, table lamps and shades, are also available in many novel designs and materials.

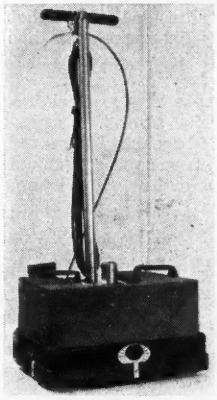
As was the case with last year's Fair, most of the vacuum cleaners are to be found at Earls Court, where eight exhibitors are showing industrial and domestic models together with a selection of hair dryers, floor polishers, scrubbing machines and domestic washing machines. There are very few new appliances in this section, but manufacturers have improved existing models and have increased production so that they are now in a better position to meet customers' orders.

Apart from their washing machine, Hoover are showing the "De Luxe" model 612 vacuum cleaner which they also exhibit at Birmingham. Amongst new appliances is the "Handyman" light industrial polishing and sanding machine, made by Electrix, Ltd., which will also find application in the domestic field. The same company is producing Blanch-Electrix butter-making equipment which is automatic in operation and incorporates no moving parts in contact with the cream, the butter being made by filtered air agitation. It will convert up to three gallons of cream into butter in approximately 20 minutes.

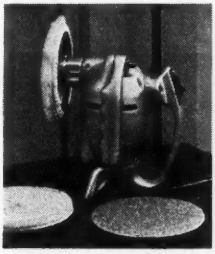
A comparatively new company, H. E. Taylor, Ltd., are showing various domestic cleaners, floor polishers and hair dryers, and a floor scrubber and polisher combined which may be used as either at will. A departure for Scophony-Baird, Ltd., who are scientific instrument makers, is the production of the "Minor" electric fan. It is of pleasing appearance, fitted with a silent running shaded-pole motor driving a four-bladed 7.5 in. diameter propeller, and is available for operation from all normal a.c. supplies.

The electric clock industry is represented at Olympia this year in greater strength than ever before, indicating that it is expanding rapidly and endeavouring to capture world markets. Apart from alarm clocks there are striking and chiming clocks, but the majority of these are for export only. There are also systems of synchronized "slave" dials controlled from a central master clock, and many types of industrial clocks, time switches, recorders and controllers.

Most of the lighting fittings are, as usual, to be seen in the London sections.

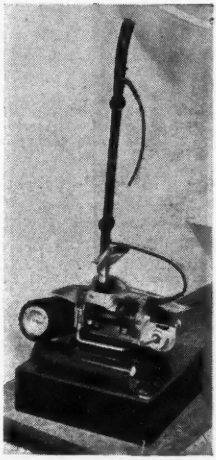


Floor polisher and scrubber combined (H. E. Taylor)



Hand polishing and sanding machine (Electrix)

Truvox demonstration model industrial floor polisher

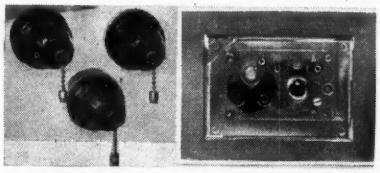


# Accessories

IT is disappointing that the array of 158 stands in, and several others outside, the central electrical section at Castle Bromwich is even less representative than it was last year of the multitude of wiring accessories used by installation contractors.

There are now about twelve million consumers in this country. Less than a million of them are served by d.c. distribution systems. No one knows how soon, if ever, a.c. will become universal. Meanwhile d.c. appliances and accessories continue to be specified for both private and industrial installations. Thus it is reassuring to know that the 3 kW plug with a fuse forming one of the three pins inserted in the outlet sockets is just as suitable for d.c. as for a.c.

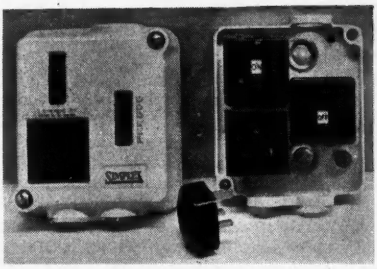
These fuses have been tested with prospective currents of 10,000 A at 500 V



**Double shuttered Walsall switched 'outlet' in transparent demonstration housing and (left) new ceiling switches**

and 16,500 A at 250 V at the N.P.L. and of 30,400 A at 260 V by Manchester Corporation, all d.c., while a.c. tests have been made with 25,000 kVA at 400 V by Salford Corporation and with 31,000 A at 440 V by Preston Corporation. The fuses functioned without flash or report, being enclosed in tube of a special ceramic called "Alorite" which was produced by Dorman & Smith, Ltd., to withstand the stresses involved. They intended to avoid the risk of serious injury to anyone plugging-in with bare hands (a certainty in course of time) on a dead short circuit. Oscillograph records show the circuit breaking time to be 0.0006 second. The latest addition to the "DS" range is a three-way fused adaptor, fully shuttered.

Another multi-plug adaptor is offered by Clang, Ltd., for various 2, 5 and 15 A combinations with two and three pins. A clock connector fused plug and socket is

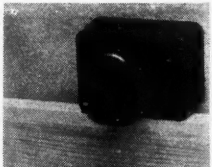


**Revised Simplex cooker control unit which is smaller than previous models**

also available, single or double pole, for surface or flush mounting or conduit fitting.

A newcomer is New Day Electrical Accessories, Ltd., all of whose products have been developed since the end of the war, employing micro-gap switching and "unit" construction for quick fixing without on-site assembly. Flush tumbler switches have silvered contacts and ball bearing pivots. The "Twin Two" outlet consists of two 2 A sockets built integrally with a common base and front plate, fixed by two screws only, for doubling existing outlets by looping out 5 A wiring. The novel triple "Fireside" outlet has a main 3 kW (BS. 1363) socket with two 2 A (BS. 546) auxiliary sockets protected by a 5 A cartridge fuse in a self-ejecting carrier, connected by a single set of terminals and fixed by two screws. A press-button 3 kW switched socket of the fused plug rectangular pin type can be mounted in a box or directly in the wall skirting.

Fused plugs with "flat" pins (BS. 1362/3) are now obtainable with switched as well as unswitched sockets from Walsall Conduits, Ltd. There is also a new switched 5+15 A socket outlet with double shutters which move in-



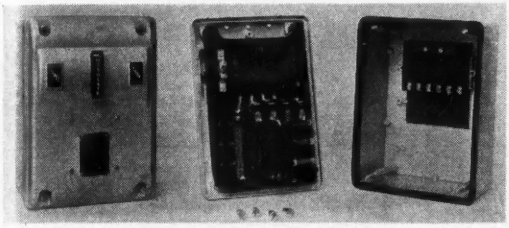
**Unusually compact Simplex metal and Lundberg moulded 15A switch plugs**

dependently and in opposite directions over each live pin hole, so departing from the interlocking principle which is, however, still retained for the industrial range. A fresh range of pull-cord ceiling switches retain the same movement, but have smaller housing of more pleasing shape, moulded or metal in all colours.

Two new 15 A switched plugs by the Simplex Electric Co., Ltd., both double pole for surface mounting, have micro-break silvered contacts. The iron box type, fully interlocked, has knock-outs for any form of wiring, while the smaller all-insulated "Lundberg" pattern is only $2\frac{3}{8}$ in. wide by $3\frac{3}{8}$ in. long. They are among the most compact of their class. The revised Simplex cooker control unit is appreciably smaller than last year's model. It is rated at 30 A, has shuttered sockets and a Lundberg plug of modern shape with rectangular pins. There is top entry and two knock-outs to assist connection through a partition wall, if necessary.

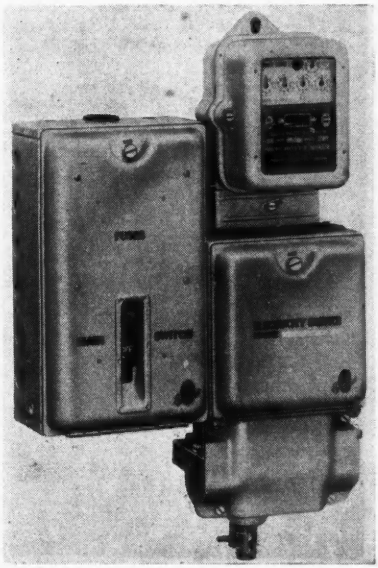
There is some indefiniteness of description about consumers' house service units, combining a main switch and fuses in one box alongside the intake service box below the meter. The new enamelled sheet-steel Walsall model is termed "single chamber," whereas the Revo Electric Co., Ltd., is now making a "two-piece" model as well as the three-piece type with switch and fuses in separate chambers. A feature is simplicity of meter connection, in three ways. An adjustable plug-in block is arranged to accommodate most types of quarterly and prepayment watt-hour house service meters; or an insulated template together with a moulded clamp for shielding the leads between meter and intake chamber; or an insulated template only can be drilled on site for conventional trailing connections. Both two- and three-piece house service units are offered by British Insulated Callender's Cables, Ltd., as well as a three-meter arrangement. Advantages claimed for these forms of construction are that fewer component parts are needed, insulation is facilitated and cost is lowered.

Besides wood fuse boxes and switch-fuse assemblies in cast and die-cast boxes, or on porcelain bases with moulded cover or case, E.G.A. Electric, Ltd., has a neat direct-on starting contactor for from $\frac{1}{3}$ to $7\frac{1}{2}$ h.p. In the metal box is a six-contact plug-in terminal block, all the rest of the gear and fuses being fixed to the lid for quick replacement. There is pull-rod isolation between the "on" and "off" push buttons; the "Junior" has a porcelain instead of moulded base; star-delta and pole-changing models are to follow.



**Contactor starter of "EGA" withdrawable lid design incorporating three fuses**

The cable makers' re-entry to the Fair last year for the first time since before



**B.I. Callender's consumer's service unit**

the war was apparently not effective. This time most of them are content to be collectively represented by the C.M.A. display with some specialities on adjacent stands. The oscillator fault locator named "Bimec," by B.I. Callender's, provides 30-40 W output at 1 to 1.4 kc/s for 110-210-230-250 V energization or 12 V battery operation.

Narrow underground link disconnecting boxes with improved sealing are made by H. J. Baldwin & Co., Ltd., as well as pole-mounting cable dividing boxes for from 3.3 to 33 kV.

In addition to cables specially developed for television work, "Sterline" wire has been designed by the Sterling Cable Co., Ltd., for overhead lines to withstand extremes of temperature and humidity. It is lighter in weight and of smaller diameter than normal aerial cable, being also cheaper.

Cable drums are offered by Stewarts & Lloyds, Ltd., while cable fittings and brackets are made by Hale & Hale (Tipton), Ltd. The fixing devices of Rawlplug, Ltd., now include a new girder clip to take brackets at any angle for carrying cable and conduit.

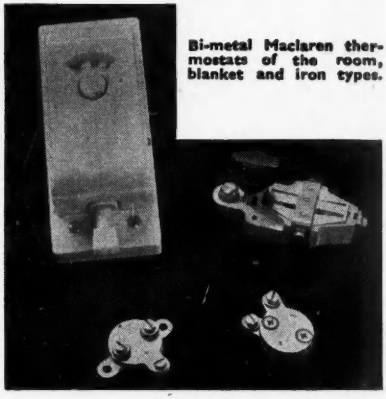
A feature of the industrial distribution equipment made by the Power Centre Co., Ltd., has always been cable trunking and one variety is now divided into compartments with adjustable cross-over units to enable cables to be taken from one compartment to another. An improved system of tapping cables is shown for the first time. There are fresh Walsall lines in bus-bar trunking and sheet-steel fabricated bus-bar chambers.

**Weatherproof "Clang" top outlet inspection elbow**

More conduit and accessories are to be seen this year on a dozen stands, including the recently described plastic "Egatube," rigid but bendable, in all colours. Weatherproof "Clang" conduit fittings are zinc base castings, including a top outlet inspection elbow. Die-cast "Mazak" alloy accessories in the G.E.C. range for aluminium conduit include a switchbox for "Mutac" silent switches with adjustable grid for surface installation in single and multi-gang sizes. Seal Conduit Co., Ltd., offers both aluminium and steel tubing with fittings in various colours.

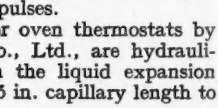
Among temperature regulating devices Robert Maclaren & Co., Ltd., make double bow room thermostats, small discstats for blankets, toasters, kettles, percolators, and an iron regulator.

It is claimed that a truck propelling battery should be rechargeable as quickly as it can be discharged, providing the temperature rise within the cells can be limited. For this purpose a Maclaren stem thermostat has been developed which is inserted into the battery, the acid-resisting sheath being slotted at the end to present a thin slot "wall" for quick response to temperature rise. The on-off action thus charges the cells by a series of current pulses.



**Bi-metal Maclaren thermostats of the room, blanket and iron types.**

Two new cooker oven thermostats by the Rheostatic Co., Ltd., are hydraulically operated on the liquid expansion principle with a 36 in. capillary length to overcome the limitation of mounting position imposed by the solid stem type. There is also an inexpensive 100 W thermostat for small "domestic" green-



**Battery charging Maclaren thermostat**

**Novel "EGA" airless all-electric paint spraying gun**

houses and amateur gardeners. The new "Satchwell" flame-failure device for gas-fired boilers utilizes a pilot jet impinging on a thermo-couple, which energizes a sensitive relay. The latter is held down magnetically (making circuit to keep the fuel open) so long as sufficient current comes from the hot-couple; if flame extinction cools the latter the relay will close the fuel valve.

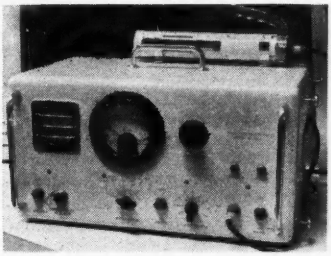
Finally, the prototype of the paint-spraying gun being developed by E.G.A. Electric, Ltd., is quite novel. It does not use compressed air; instead the paint is lifted up a vertical tube in corkscrew fashion and spilled into a spinning dish. It is thence whirled upward and sideways into six centrifuges, three on each side, which direct it outward through the nozzle. The five-shaft gear box contained within a sphere of 1 in. diameter is remarkable and the 60 W universal motor is of a well-known make. There are no valves or needles; square-ended shafts avoid screw fixing and there is only one through bolt in the casing, which is in three parts so that the motor, gear box or head may be quickly replaced. The whole weighs about 2.5 lb, with pistol grip, trigger control and thumb wheel spray adjustment within narrow "line" limits.

Since the paint is not atomized, there is no mist or spray "bounce," enabling the gun to be used within an inch of the surface being sprayed.

# Scientific Instruments

ON entering Olympia this year, visitors to the Fair are confronted with the wide range of exhibits which illustrate the high quality and diversity of British scientific instruments. Many of the exhibits will be familiar to those British engineers who visited the Physical Society's Exhibition, but this does not in any way detract from the value of the Fair, as its main purpose is to further the sale of British goods overseas. Broadly speaking, the theme of the display is the close relation between the production of scientific instruments and this country's efforts to recover her position in world markets by increased productivity.

On examining the electrically operated instruments, it becomes clear that the British scientific instrument industry is now second to none. There is an increasing use of valves for industrial purposes other than in radio equipments, and many new types have been developed to suit particular requirements both in controlling and in measuring devices. A great deal of attention has also been devoted to the improvement of the external appearance of equipment, combined with a simplification of controls, so that the minimum number of adjustments have to be made during operation.

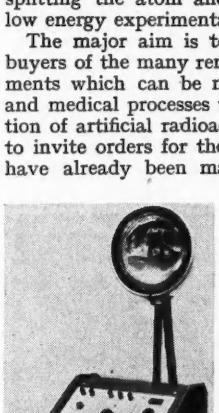


**Radiation monitor (Airmec)**

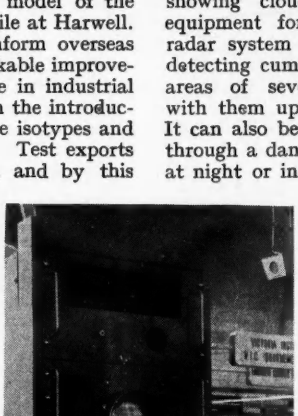
As has been the case in previous years, this section of the Fair has been arranged around a central exhibit designed to illustrate some particular application of the use of scientific instruments. By arrangment with the Ministry of Supply, this year's central exhibit, by the Atomic Energy Research Station at Harwell, shows the public for the first time the

many peaceful uses in industry, medicine and research to which radioactive isotypes, the by-products of nuclear fission, can be put. The exhibit includes the original apparatus used by Cockroft for splitting the atom and a model of the low energy experimental pile at Harwell.

The major aim is to inform overseas buyers of the many remarkable improvements which can be made in industrial and medical processes with the introduction of artificial radioactive isotypes and to invite orders for them. Test exports have already been made, and by this summer Britain will be in a position to export isotopes in quantity.



X-ray dose and dose rate meter (Baldwin)



High-power stroboscope (B.E.P.)

Among instruments for use in atomic and associated research, a radiation monitor by Airmec Laboratories, Ltd., is for the detection of alpha and beta particles and gamma rays, suitable probes being provided for each application. The probe is connected to the instrument by a flexible lead, a moving coil meter providing direct readings of intensity and a loudspeaker audible indication of activity. Other instruments for use in the same field are to be seen on the stand of the Baldwin Instrument Co., Ltd., where there is an ionization chamber X-ray dose and dose rate meter, the sensitivity of which is such that a very wide range of radiation intensity can be measured.

Turning to radar, E. K. Cole, Ltd., are showing cloud and collision warning equipment for aircraft. This X-band radar system is designed primarily for detecting cumulo-nimbus clouds and the areas of severe turbulence associated with them up to distances of 40 miles. It can also be used for selecting a route through a dangerous formation of clouds at night or in bad visibility.

Amongst temperature measuring, recording and controlling devices, the British Rototherm Co., Ltd., is showing a thermostatically controlled low-temperature bath designed to cover a range between ambient and −75 deg C which may be used for calibrating low-temperature instruments. It consists of a tank and circulatory system controlled either automatically or manually to pass quantities of the circulating liquid over a block of commercial carbon dioxide. It embodies electronic control, and the differential of the tank is adjustable.

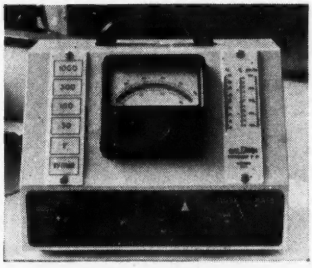
Another constant-temperature bath, exhibited by Townson and Mercer, Ltd., is for maintaining crystals for electrical purposes at very constant temperature, and also for the extremely fine changes of temperature required for successful crystal growth. An indication of the high quality of this appliance may be gathered from the fact that it has an accuracy of 0.001 deg C, whereas the best American bath of the same kind has an accuracy of about 0.02 deg C at 100 deg C.

An unusual application of stroboscopy is illustrated by a display arranged by Dawe Instruments, Ltd., to demonstrate the tuning of musical instruments.

Stroboscopic discs, suitably marked to give notes on the tempered scale, are illuminated by a stroboscopic lamp connected to an amplifier and microphone. A stationary pattern occurs at the frequency corresponding to the note being sounded. In this way it is possible to achieve great precision of setting and a considerable speeding up of the actual tuning process.

Among miscellaneous control devices and equipments for mechanical analysis work, a high-power stroboscope made by British Electronic Products, Ltd., operates over a very wide frequency range and has unequalled light output, enabling a complete machine to be flood-lit so that stroboscopic observation of the whole of its operation is possible. Other stroboscopic equipment is shown by Scophony-Baird, Ltd., together with a sound conversion kit for home cinema projectors. This comprises a magnetic tape recorder designed to fit any 16mm, 9.5mm or 8mm projector, and is provided with amplifier, microphone and loudspeaker carrying case.

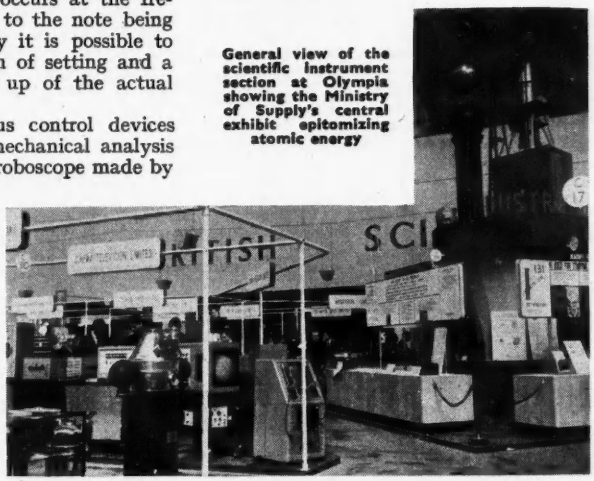
During the past year C. H. Blackburn and Co., Ltd., who are exhibiting instrument sterilizers and food conveyors for hospitals, have entered the photographic field and are making a new type of flash



**Universal valve tester (Cintel)**

synchronizer for the well-known Leica camera. It is adaptable for foil or wire-filled flashbulbs of the combustion type, providing perfect synchronization for the more recent electronic high-speed flash equipments.

**General view of the scientific instrument section at Olympia showing the Ministry of Supply's central exhibit epitomizing atomic energy**



On one Marconi stand there is a goodly display of X-ray and electro-medical apparatus, while on the other there is a selection of telecommunications testing equipment, including a direct reading circuit magnification meter for use in the range 15-70 Mc/s. It uses only one meter for the simultaneous monitoring of the injected and developed e.m.f.s by a balance method which renders the oscillator level non-critical. The essential controls consist of an oscillator frequency dial, a slow-motion tuning dial for the test circuit and a dial calibrating directly in Q.

Apart from stabilized power packs for laboratory use, an oscilloscope developed by Furzehill Laboratories, Ltd., for low- and audio-frequency work incorporates d.c. amplifiers, and will be particularly useful in servomechanism and physiological investigations. Other instruments for industrial applications are shown by Cinema-Television, Ltd., together with a most comprehensive rack-mounted valve tester designed to display on a cathode-ray tube screen a family of anode-volts/anode-current curves for any type of receiving valve, curves for ten different grid potentials being displayed simultaneously.

# Switch Test Severity

## INFLUENCE OF SOURCE OF ENERGY

IN the course of research in connection with gas-blast circuit breaking at the Electrical Research Association's laboratories some highly significant and interesting results were recently obtained by substituting a charged condenser as energy source for the usual (6.6 kV, 10,000 kW) alternator of the test circuit. The condenser was charged to about 10 kV (equivalent to the peak value of a 6,600 r.m.s. volt wave) through a high resistance from a rectifier and step-up transformer energized from the ordinary domestic lighting mains.

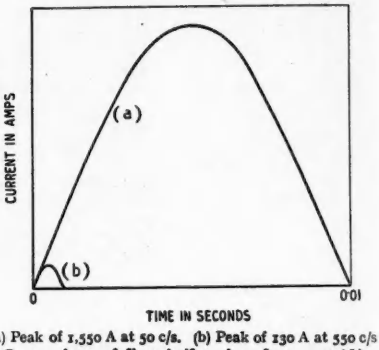
It can be shown that, with this arrangement, closing the condenser on to the circuit causes a damped oscillatory current to flow of frequency determined generally by the capacity of the condenser and the total inductance of the circuit. The former, in the tests mentioned herein, was 5 $\mu$F, and the latter, which included an inductance equivalent to that of the alternator, approximately 0.019 henry (equals 6 ohms at 50 c/s) giving a frequency of some 550 c/s and a peak current in the first half cycle of about 130 A. Under these conditions, it can be shown that the rate of change of current at the end of the first half cycle of current will be approximately equal to the rate of change of current obtaining at zero for a 50 c/s wave of 1,100 A r.m.s., and that the wave front of the restriking voltage is, for practical purposes, the same as that obtained with the alternator excited to 6,600 V r.m.s.

### Difficulty in Clearing

Tests made on an experimental gas-blast circuit-breaker under these conditions* at once showed that the breaker was finding difficulty in clearing the circuit, although it was one which had been in constant use for breaking the 1,100 A r.m.s. from the 10,000 kW alternator referred to above. It was found in fact that the task imposed on the breaker in clearing the circuit at the end of the first half cycle of arcing was of the same order as that experienced when the alternator was used as the power supply, the arc in both cases being initiated by a fine fuse wire.

The scope of the tests described was limited and the range of equivalence of the two methods may exist only over part of the power-frequency current range of certain types and designs of circuit-breaker. It is thought that these breakers (as in the case of the one used in the present experiments) will be found to be of types in which, within the appropriate range of power-frequency current, substantially the whole ionized products of prior arcing in the half cycle are swept from the arc gap by a time just before current zero.

However, the significance of the observations already made is clearly of great importance, especially to those engaged in research on the fundamentals of circuit-breaker arcs.




(a) Peak of 1,550 A at 50 c/s. (b) Peak of 130 A at 550 c/s

**Comparison of first half cycles of current (A) from a generator, and (b) from a condenser**

Although, it is stated, this particular aspect of the experimental work with charged condensers is only in its initial stages, the E.R.A. is actively following up the various implications. These include possible application to synthetic testing in which the effects on the breaker structure of the heat of the power arc and of the electromagnetic forces set up by the full power-frequency current can be obtained by suitable combination of the high-voltage condenser discharge, near current zero, with a heavy power-frequency current supplied by a source of relatively low voltage.

*See E.R.A. report G/T230, "Severity of Circuit Breaker Test Conditions," by F. O. Mason, B.Sc. (Eng.), A.M.I.E.E.

## Standard Voltage at Dundee

Supplies in the Dundee area of the North of Scotland Hydro-Electric Board are to be changed from 200 V to the national standard of 240 V during the next three years. Conversion from d.c. to a.c. in the centre of the city will be completed at the same time.

# E.A.W. Conference

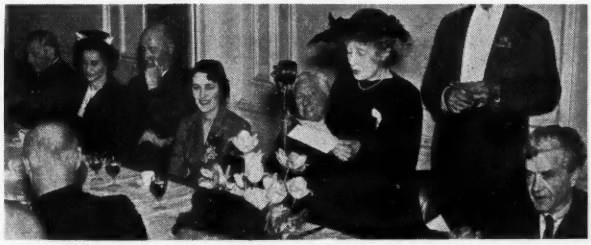
## ELECTRICITY AND THE RURAL COMMUNITY

OVER 500 delegates from all parts of the country attended the annual conference of the Electrical Association for Women, which was held on Friday last at the Connaught Rooms, London, W.C.2, under the presidency of the Dowager Lady Swaythling.

At the annual meeting held in the morning, Dame Caroline Haslett, Director and Secretary of the Association, in presenting the annual report, said that in the past twelve months the great changes in the electricity supply industry resulting from the Electricity Act, 1947, had taken real effect. The year's events had emphasized the direction future E.A.W. development was to take. The Association had been recognized as an established part of the community, and its work continued on the same independent basis on which it was founded twenty-four years ago. In her review of the past year's activities of the Association, Dame Caroline mentioned that it now had over ninety branches. She referred to such matters as the work undertaken for the aged, and the affiliation scheme which had been widened to include colleges as well as schools. A number of E.A.W. members had been appointed to the Electricity Consultative Councils. The Association had taken a leading part in the fuel economy campaign and had co-operated with Government Departments, local authorities and other organizations in the measures taken to achieve national economy.

On the previous day the golf competition for the Lady Hughman Challenge Bowl had been played at Banstead Golf Club, and at the close of the annual meeting the Dowager Lady Swaythling presented the trophy to the winner, Mrs. H. F. Carpenter.

Electricity in the service of the community was the theme of the speeches at the luncheon which followed the annual meeting. Many well-known men from all branches of the electrical industry, and several Ministers of State attended.



**Lady Swaythling speaking at the E.A.W. lunch. Left to right: Mr. L. Silkin, Mrs. Haldane, Sir Henry Self, the Countess of Albemarle, Lord Citrine, Lady Swaythling and Mr. T. G. N. Haldane**

The toast of "The Future of Electricity in the Service of the Community" was proposed by the Countess of Albemarle, chairman of the National Federation of Women's Institutes and chairman of the Development Commission, who said that electricity was one of the fundamental amenities of the age, and spoke of its value on the farm, in rural industries, in the country home and in the social activities of rural communities, referring to these communities as the "Cinderellas of the electrical age." The Electricity Act was a beacon of hope for these eager potential consumers, but it was still flickering on a distant horizon. In time electricity must come to the country housewife, but she must be enabled to take full advantage of it. This entailed not only a service of supply, but information and education and adequate servicing provisions. The country housewife prided herself on her homecraft and would only accept instruction from someone who she felt had personal knowledge of homemaking.

**Ald. Miss Mary Kingsmill-Jones, Mr. E. Shinwell, Lady Citrine, Mr. G. Tomlinson, Lady Self and Mr. A. Robens**

In responding, Mr. T. G. N. Haldane, president of the Institution of Electrical Engineers, referred to the enormous extent to which applied science had affected modern life. Applied science, however, was a means to an end and not the end in itself. The ultimate end must be found in a plane of things spiritual and not material. We were getting near to the time when we could use electricity more freely than in the past. To meet the anticipated demands in twenty years' time we should have to legislate for 180,000 million kWh and a maximum demand of 38 million kW, about four times the present consumption. We should not neglect any sources of power development, and he referred to the investigations being made by the Electrical Research Association in wind power development, which he said justified a degree of optimism in the future large-scale use of wind power, which might have a considerable bearing, initially on rural electrification.

The toast of the E.A.W. was proposed by Sir Henry Self, deputy-chairman of the B.E.A., who referred to the steady growth of the Association. Its status was now established, and in its twenty-fifth year the part it played in national and local developments was ever increasing. To-day housewives had much brighter prospects. The electricity supply industry was just beginning to see the close of a trying period, but the end was in sight. The housewife who wanted to use a little more electricity to brighten her home could now do so provided that the additional consumption, and as far as possible, all domestic demands were at other times than peak electrical demand. The increased use of electricity off the peak both eased the domestic fuel position and also helped the finances of the B.E.A.

Ald. Miss Kingsmill-Jones, Lord Mayor of Manchester and president of the Manchester & District Branch of the E.A.W., said that the intelligent use of electricity in the home would enable the housewife to take greater interest in activities outside the home. The E.A.W. report showed that the Association's activities made a definite contribution to the life of the community. The Association was now officially recognized.

At the Council meeting in the afternoon the following officers were re-elected: The Dowager Lady Swaythling, president; Mrs. A. B. Lewis, J.P., chairman; Mrs. G. A. Tatchell, J.P., hon. treasurer; and Mrs. A. T. Dover, B.Sc., vice-chairman.

## German Power Engineering

THE latest B.I.O.S. Overall Report published by H.M. Stationery Office is entitled "Electric Power Engineering in Germany During the Period 1939-45." It has been prepared by Mr. G. R. Peterson, overseas liaison engineer and personal assistant to the deputy chairman (operations), British Electricity Authority, from the following summary reports: Electrical Generation, Transmission and Distribution: Mr. C. W. Marshall, deputy chief engineer (research), B.E.A. Cable Industry: Joint Committee of the Electrical Cable Making Industry. Generators and Motors: the late Mr. A. Southworth, General Electric Co., Ltd. Batteries and Battery Traction: Mr. P. G. Boyd, Electricity Supply Board, Eire. Transformer Industry: Mr. H. M. Lacey, Electrical Research Association. Switchgear: Mr. W. B. Whitney, E.R.A.

Reviewing the developments in German electrical power engineering during the war period, it has been found that the transmission voltages were higher, i.e., 220 kV as compared with 132 kV in this country; the Germans, therefore, had developed considerably greater experience in the use of h.v. switchgear, transformers and other transmission equipment. An interesting development that took place in Germany was the laying of an experimental 70-mile cable designed for 150 A and 200 kV. A horizontal press designed by Schloemann to produce extruded seamless aluminium sheathing is an important innovation, reducing the weight and increasing the strength of the resultant cable. Substitutes were developed in the battery field and a shortage of manganese dioxide led to the development of batteries of the air depolarized type, which proved more satisfactory for wireless h.t.

Many other interesting and important developments are discussed in this report (1s 4d post free) which contains 44 pages and over 160 references to individual German reports.

### Rubber Statistics

ACCORDING to figures supplied by the Secretariat of the Rubber Study Group, Brettenham House, Lancaster Place, W.C.2, consumption of natural and synthetic rubber during March outstripped production. The production of natural rubber is put at 117,500 long tons and consumption at 130,000 tons; the figures for the first quarter of the year were 337,500 tons and 377,500 tons respectively. Synthetic rubber production in March was 40,000 tons and consumption 42,500 tons, the figures for the first quarter being 122,500 tons and 120,000 tons respectively.

# COMMERCE and INDUSTRY

## Lamp Price Revisions : District Heating Investigations

THE Electric Lamp Manufacturers' Association announces that owing to increased productive efficiency the list prices of lamps made by E.L.M.A. members in 40 to 500 W sizes, 200-260 V pearl and clear, are being reduced on and from 1st June, 1949. For example, the 40 W and 60 W single-coil lamps will be reduced to 1s 1d and the 100 W to 1s 6d. In total the reductions average approximately 10 per cent. At the same time, because of increased costs, the list prices of a few special types of lamps are being increased.

### Cable Makers' Holidays

Following the refusal of the Employers' Association to approve an application by the trade unions to the Joint Industrial Council for the Electrical Cable Making Industry that the holidays with pay agreement should be revised so as to provide for two weeks' annual holiday with pay, the matter was referred to arbitration. The award of the arbitrator dated 13th April last is in favour of the employers' rejection of the claim.

### Midlands Board and R.T.R.A.

An application by the Midlands Electricity Board for membership of the Radio and Television Retailers' Association was considered by the Council of the Association last week. Alderman W. S. Lewis, chairman of the Board, had earlier stated that it would be the Board's policy to trade on ordinary business lines. The main reason why it had applied for membership was to enable it to operate on the same basis as other traders. The application was rejected by the Council, which is of the opinion that municipal and State trading in any form is wrong in principle.

### National Joint Advisory Council

The National Joint Advisory Council, representing the British Employers' Confederation, the Trade Union Congress and the managements of nationalized industries, held its quarterly meeting at the Ministry of Labour and National Service last week, under the chairmanship of the Minister.

Reference was made to impediments to production resulting from so-called "restrictive practices" in industry—a question which had been raised at previous meetings of the Council, and which it was thought might usefully be discussed between the parties represented on the Council. It was agreed that a sub-committee representing the Confederation, the Congress and nationalized industries should be appointed to consider the subject and make a report to the full Council.

The Council received a report on the operation of electricity load-spreading arrangements in the past winter. It was stated that an excess of demand over supply is anticipated for some time to come. The Electricity Sub-Committee will therefore meet shortly to consider what arrangements will be necessary for next winter.

### Power Plant for Isle of Man

The Isle of Man Electricity Board has placed an order with Associated British Oil Engines, Ltd., and the Brush Electrical Engineering Co., Ltd., for diesel-electric generating plant and switchgear to provide electricity for the whole of the Isle of Man excluding Douglas, which has its own station already equipped with Brush turbines. The contracts include six sets comprising Mirrlees "HFS" 8 eight-cylinder turbo-charged engines developing 1,320 b.h.p. at 375 r.p.m. direct coupled to Brush 920 kW, 1,150 kVA 0.8 power factor 11 kV three-phase 50 cycle alternators rated in accordance with BSS 226/1925. With each alternator is included a "Tirrill" type vibrating contact automatic voltage regulator and there are two Brush transformers each having a capacity of 50 kVA with a voltage ratio of 11,000/400. The main switchgear will consists of a 15-panel Brush switchboard and there will also be six exciter cubicles, a four-circuit auxiliary switchboard, a lighting distribution board and power distribution board.

### Vehicle Association Luncheon

The annual luncheon of the Electric Vehicle Association of Great Britain is to be held at the Connaught Rooms, London, W.C.2, on 18th May. Sir Cyril Hurcomb (chairman, British Transport Commission) will be the principal guest and will propose the toast of "The Electrical Vehicle," to which Mr. Peter Rochs (chairman of the Association) will respond. It is expected that the other guests will include Lord Citrine (chairman, B.E.A.), Lord Hyndley (chairman, National Coal Board), and Mr. Alfred Robens (Parliamentary Secretary to the Ministry of Fuel and Power.

### Flexible Packaging Exhibition

An Exhibition of Flexible Packaging Materials, organized jointly by the Council of Industrial Design, the Institute of Packaging, and the Printing Packaging and

Allied Trades Research Association, was opened on Tuesday last by Mr. G. M. Ashwell, president of the Institute of Packaging, at Murray House, Petty France, London, S.W.1. Representative samples of flexible packaging from over sixty firms are shown under such headings as protective papers and sealing materials, metal foils and collapsible tubing, plastic materials, protective chemicals and adhesives. Some finished packages are displayed to illustrate the use of the raw materials. The exhibition remains open until 31st May.

## Fusegear Display at Blackburn

A wide range of modern fusegear is on view at the English Electric Co.'s showrooms at 32, New Preston Road, Blackburn. The exhibits include specially designed equipment for distribution in textile mills, overhead busbar equipment, open-type substation fusegear, metalclad fuse-switchboards and distribution fuse boards, etc. The exhibition closes on 21st May.

**Part of the fusegear display at the English Electric Co.'s Blackburn showrooms**

## Stanley Civic Restaurant

The all-electric civic restaurant of the Stanley (Durham) U.D.C., which was described in our last issue, was officially opened on 30th April, the ceremony being performed by the Council's chairman (Mrs. E. Brass). The restaurant can seat 200 people, and has been built from three prefabricated units. Mrs. Brass said that at one time it was rather an occasion for people to eat away from their homes, but the war had brought many changes. The provision of the restaurant would meet a very big need in Stanley by providing means for social contact and she hoped the people would make use of it. Proposing the "Guests," Mr. F. J. Goss, vice-chairman of the Council commented that for many years, Stanley Council had one of the most efficient electricity undertakings in the North of England. Deputations from other areas had come to see the town's street lighting system. Mr. James E. Glanville, M.P. for the Consett Division, replying, referred to the ideal working conditions in the retaurant for the staff. Mr. E. C. Lennox, manager of the Wear Sub-area of the North Eastern Electricity Board, said the electrical equipment could be maintained with the minimum of labour.

## Batti-Wallahs' Society

An interesting film showing the development of the Cornish steam engine was the principal feature of last week's luncheon of the Batti-Wallahs' Society. The chief guest was Dr. H. W. Dickinson, president of the Cornish Engine Preservation Society, who said that, in presenting the film, he felt that the audience would get a much clearer impression of the history and development of the steam pump engine than by a talk. He considered that the period up to the development of the Cornish engine was one of the great periods in British engineering.

The film, which was made by the Shell Film Unit, shows how the engine was gradually developed from the water-raising engine of Savery in 1698, the first cylinder and piston engine of Papin (1690), the atmospheric engine of Newcomen (1705), the introduction of the separate condenser by James Watt (1763), and the use of relatively high-pressure steam by Trevithick (1800). Despite their age, some of the engines are still in use.

The next luncheon of the Society will be on 26th May, when the speaker will be Mr. Barrington-Dalby.

## Devon County Show

Milk cooling will be a special feature of the South Western Electricity Board's exhibit at the Devon County Show to be held at Stover Park, near Newton Abbot, from 10th to 12th May, when several types and sizes of electric coolers will be on view. A comprehensive range of agricultural appliances will be exhibited including electric root pulpers, corn grinders, cold frames and greenhouses incorporating electric soil-warming apparatus, seed conditioners, horse clippers and incubators. Chickens will be hatched out in the incubators during the period of the show. The Electricity Board's site will include a main pavilion with an inquiry bureau and a display of domestic appliances, a large marquee containing agricultural equipment and three

smaller marquees one of which will be used for film shows. The main caterers to the Show will be using electricity exclusively for the preparation of food, and more than thirty exhibitors have already made application for an electricity supply on the show ground. The maximum demand is expected to exceed 300 kW.

## Gamma Rays for Industry

Radium and radon, which are sources of highly penetrative gamma rays, can now be supplied for industrial radiography, announces the Ministry of Supply. Radium, which is best suited to factories and foundries where there is constant radiographic work, is available on hire only; the radium will remain the property of the Government. It can be hired for periods of not less than six months, and the average time to fulfil an order is two months. Radon is sold outright, and only one week's notice of an order is required. Demonstrations of gamma radiography for industrialists can be seen by appointment at the Ministry's Armament Research Establishment, Woolwich, and at the National Physical Laboratory, Teddington. Radium and radon are supplied by the Radiochemical Centre, Amersham, and applications for purchase or loan should be addressed to that establishment.

## Television Link

In collaboration with British manufacturers, B.B.C. engineers are actively engaged on the exploitation of light-weight television outside broadcast equipment. The aim is to extend the scope of these operations and to increase the speed with which equipment can be set up so that events of topical interest can be televised. In particular, an improved radio-link has been developed to transmit television pictures from the cameras to Alexandra Palace for broadcasting in the normal service. This equipment, which works on a wavelength of 4.5 cm. is now being tested, and exceptionally clear pictures are being received over a distance of seven miles. There seems to be no reason why equally good results should not be possible at a range of 20 miles, or by covering the distance in two or more "hops" even further.

## "Industrial Building"

A new booklet of advice to industrialists wishing to extend their premises, or to build new premises, has been issued by the Economic Information Unit, Treasury, S.W.1. The process of obtaining the necessary consents for such work has been somewhat obscure, and the new booklet is intended to clarify the procedure. After outlining the controls of industrial building which are still necessary, the booklet explains how the industrialist can secure the help of Government Departments in obtaining the necessary permissions. There are two appendices, the first giving a list of industries classified under the Government Departments which sponsor them, and the second giving Regional Officers of each Government Department, with addresses and telephone numbers. The booklet is free of charge, and can be obtained from any Regional Office of the Ministry of Works, the Ministry of Supply or the Board of Trade.

## B.E.A. and District Heating

The British Electricity Authority requires assistants to conduct investigations into the use of thermal electric generating stations for district heating schemes. They will be attached to the District Heating Section of the Generation Design Department of the headquarters engineering staff, London. There are three grades—senior assistant engineers (£865-£1,127); second assistant engineers (£707-£970); and third assistant engineers (£629-£760). Applicants are required to possess the requisite qualifications for corporate membership of the Institutions of Electrical or Mechanical Engineers and have power station or pass-out turbine experience.

## Film Producers' Journal

From the Film Producers' Guild, Ltd., Guild House, Upper St. Martin's Lane, London, W.C.2, we have received a copy of the Guild's new journal *Imagery* which deals with the activities of the eight constituent producing companies. Well produced and illustrated, the publication contains articles on various phases in the production of educational and publicity films. Among them is one by Mr. W. M. Tribute upon films produced for Hoover, Ltd., and a "profile" of Mr. Cecil Musk, who directed the E.D.A. film "Can We be Rich?"

## United States Instrument Exhibit

The Fourth National Instrument Exhibit is to be held in the St. Louis Municipal Auditorium from 12th to 16th September next. The display will be limited to 20,000 sq ft of floor area, and the exhibits will include scientific and industrial instruments and devices for measurement, inspection, testing and control. Technical sessions of the Instrument Society of America, the American Institute of Physics, the Industrial Instruments and Regulators Division of the American Society of Mechanical Engineers, and the Instruments and Measurements Committee of the American Institute of Electrical Engineers, the Institute of Radio Engineers, the

American Institute of Chemical Engineers, and the National Telemetering Forum, will be held in the auditorium while the exhibit is in progress. United Kingdom firms wishing to participate should apply to the executive secretary of the Instrument Society of America, 1117, Wolfendale Street, Pittsburgh, 12, Pa. Inquiries about this exhibit should be addressed to the Exhibitions and Fairs Division, Commercial Relations, Horseferry House, Thorney Street, London, S.W.1 (telephone: Victoria 6800, Ext. 253).

## Refractories Research

On 26th April, Sir Charles Goodeve, O.B.E., D.Sc., F.R.S. (British Iron and Steel Research Association), opened the new Central Research Laboratories of General Refractories, Ltd., at Worksop. Sir Ronald Matthews, chairman of the company, presided at the ceremony and at the subsequent luncheon.

The new laboratories and pilot plant occupy a two-storey building of pale yellow dressed stone and multi-coloured brickwork. They will form an authoritative centre to which all problems of individual works may be referred, for the investigation of performance of refractories in use, and for the development of new processes and new refractory materials and the investigation of phenomena. Facilities include physical, research chemical, sand, and bonding materials laboratories, library and conference room, X-ray room, petrographic room, records room, balance room, dark room, machine room, offices, and stores.

## Exhibition of L.C.C. Housing Work

An exhibition showing the variety and scope of the architectural aspects of L.C.C. housing work erected or under construction since the war is to be held at the County Hall from 4th to 19th May, and will consist mainly of working drawings showing plans and elevations of modified pre-war and post-war schemes being carried out by the Council's housing architects and also a number of schemes being executed for the Council by private architects. The display has been arranged primarily for members of the architectural profession and complete sets of working drawings will be available for reference.

## Special Plant for B.O.A.C.

Some months ago the British Overseas Airways Corporation placed with the Electroplant Co. an order for an infinitely variable frequency source in the form of a potentiometer alternator. The B.O.A.C. has now placed orders for two Ward Leonard sets with outputs of 230 h.p. and 160 h.p. Both sets will be constructed from second-hand equipment to meet the special requirements of the B.O.A.C. Each set is a three-machine unit of fairly large dimensions and special switchgear and switchboard designs are included in the order.

## Trade Announcement

**Mullard Electronic Products, Ltd.,** is forming a new department at its works at Aboyne Road, Tooting, S.W.17, for handling vibration equipment for diagnosis and measurement purposes. The marketing of vibration apparatus, which includes, by agreement, specialized equipment developed by de Havilland Propellers, Ltd., will also be conducted through this department.

## Catalogues and Lists

**General Electric Co., Ltd.,** Magnet House, Kingsway, London, W.C.2.—Catalogue of electric sterilizing equipment for dairies.

**T. B. Morley & Co., Ltd.,** Jameson Street, Hull.—Eight priced folders describing lighting fittings, reflectors, fires and immersion heaters.

**Parnall (Yate), Ltd.,** 43, Parker Street, London, W.1.—Four illustrated folders on domestic electric cookers.

**British Insulated Callender's Cables, Ltd.,** 21, Bloomsbury Street, London, W.C.1.—Two brochures on fused tee boxes and a farm wiring system; also five folders on mining type straight joint boxes, copper earth rods, wires and cables for radio and television applications.

**Quasi-Arc Co., Ltd.,** Bilston, Staffs.—Pocket guide giving brief details of "Quasi-Arc" electrodes, welding sets and accessories.

**Brookhirst Switchgear, Ltd.,** Chester.—Descriptive folder on the "Isofuse" flush-mounting triple-pole fused switch.

**Runbaken Electrical Products (1931), Ltd.,** 71-73A, Oxford Road, Manchester, 1.—Folder on motor car electrical accessories.

**James Neill & Co. (Sheffield), Ltd.**—Composite Steel Works, Napier Street, Sheffield, 11.—Brochure, "Sawing Problems Solved," containing information on the use of "Eclipse" hacksaw blades.

**Hall & Pickles, Ltd.,** Port Street, Manchester, 1.—Illustrated catalogue on "Hydra" nickel chromium resistance alloys.

**Watford Instruments,** Vale Road, Watford, Herts.—Technical brochure, "Industry's Third Eye," on stroboscopes and stroboscopic equipment.

# Heat and Power Linkage

## INSTITUTE OF FUEL CONFERENCE AND LUNCHEON

THE second one-day Conference on Combined Heat and Power Supplies organized by the Institute of Fuel, which was held on 27th April, opened with a paper by Messrs. L. D. Anscombe and A. J. Ellison (B.T.H.) on technical aspects of interchange of electrical energy with the grid, with especial reference to generating units of under 1,000 kW. The approach through existing practice in the operation of synchronous motors considerably clarified the issue. A simplified method of reactor synchronizing without preliminary field excitation, which introduced no risk of appreciable system disturbance when operated by unskilled labour, was described. The authors' view that there was little in favour of the induction generator was confirmed in the subsequent discussion, which also indicated that such interchanges were quite feasible.

### Supply Authority's Position

Mr. J. N. Waite (B.E.A.) explained why the price paid by the supply authority for surplus energy could not be the same as that for the firm power it delivered as demanded. Interchange with large private stations, he said, was no new thing; what was new was the large number of small plants, the kW produced by which were of value only if they were accompanied by a guarantee of a reduction of the Authority's fixed charges for a number of years. The supply authority had to make provision for generating capacity five years ahead of demand and to cater for differences between winter and summer loads and for variations in both. The difference between mild and moderately cold conditions in winter might be two million kW and in summer one million kW. At night the base-load stations would use about 1lb of coal per kWh, whereas the older stations meeting the day peaks would considerably raise the average. Fixed charges on transmission and distribution had to be added.

Consideration was given in a paper by Dr. G. E. Foxwell to adjusting the balance between heat (mainly steam and hot water) and power by interlinking all possible sources (enumerated) among a group of industries. The desirability was discussed of ascertaining the amount of fuel to be saved by the production of steam in high-pressure boilers feeding back-pressure turbines and sending the works' power surplus to the grid or to adjacent factories. Attention was drawn to examples of savings due to interlinking cited in Fuel Efficiency Bulletin No. 51 of the Ministry of Fuel and Power. During the discussion it was pointed out that electricity generally provided the cheapest and most easily metered form of interlinking and that the seasonal variation in steam-power ratio was an important factor. The author's contention that steam could be conducted without material heat loss for long distances, if at high velocity and in well-insulated mains, drew the warning that neglect of these factors was likely to entail losses offsetting the gain through centralization. The necessity of ensuring adequate rupturing capacity of circuit breakers at small stations running in parallel with the public supply was emphasized.

The main points of previous papers (including two on heat balances by Mr. J. Edward and Messrs. J. B. M. Mason and L. Clegg, and one on steam peaks which had been presented at the first conference on 25th January)' were summarized by Mr. H. E. Partridge, who went on to give typical cases of steam-power ratios which, allowing for diversity, showed an average overall of 24 :1, and described how such conditions could be met. Combined heat and power supplies were not, however, likely to eliminate straight condensing sets, as the heat load would probably never approximate to back-pressure or pass-out balance of the whole electrical output, although the electrical load on condensing stations would be reduced, with gain in overall thermal efficiency. Investigation of the heat and power position (including domestic) in a specified geographical area was recommended with a view to deciding whether heat-electric stations, with the emphasis on the heat output, provided the best solution.

## Annual Luncheon

ATTENDANCE at the annual luncheon of the Institute of Fuel exceeded 600. The response to the only toast, "Our Guests," which was briefly proposed by the president, Dr. D. T. A. Townend, was made by Dr. H. Roxbee Cox (Chief Scientist, Ministry of Fuel and Power) and by Dr. B. Mouat Jones (former Vice-Chancellor, Leeds University).

Urging the necessity of gathering adequate data before planning thermodynamic Utopias, Dr. Roxbee Cox expressed the view that gas turbines had no serious future in this country unless they could run on coal products. Underground gasification of coal that could not be mined might provide one source, but the possibilities of total

gasification on the broadest front should be investigated and results might indicate the gas turbine as the best means of using coal. He deplored the tendency to overgrowth of committees, which could be a means of procrastination rather than of collaboration.

Dr. Mouat Jones, after a spate of witticisms with which he delighted his listeners, sounded a more serious note in a reference to the difficulties of universities in attracting and retaining first-class teaching staffs in face of the counter-attractions of industry and Government service. His experience on a Government committee during the war had revealed a serious shortage of qualified fuel technologists.

# PARLIAMENTARY NEWS

## By Our Special Reporter

THE report stage of the Iron and Steel Bill, was seriously curtailed by the application of the "guillotine" by the Government and many important issues have again not been discussed. The Government has implemented promises made in Committee and the Bill has been amended in some respects, but there has been a refusal to alter the vesting date from 1st May, 1950, to 1st January, 1951. This has led to severe criticism from the Opposition. Mr. Erroll, for instance, pointed out that experience of the nationalization of other industries had shown that nine months was not long enough for the preparatory work of transfer. Owing to the premature transfer date there had been considerable congestion in the administrative authorities in connection with electricity, which they were only now beginning to get over.

### Electricity Supply and the Services

Mr. Hurd asked the Minister of Fuel and Power if his attention had been drawn to the inability of the Southern Electricity Board to proceed with its plans to supply electricity to Woodland St. Mary and Lambourn Woodlands in Berkshire, owing to the high costs consequent on the requirement of the Air Ministry that part of the cable should be laid underground and if, in view of the urgent need for electricity to be supplied to these districts, he would consult with the Service Departments to ensure that such adventitious costs were met from public funds.

Mr. Robens, the Parliamentary Secretary to the Ministry of Fuel and Power, said that the question as to whether the Southern Electricity Board should proceed with this particular extension was a matter relating to the day-to-day operation of the Board and not one in which the Minister could intervene. As regarded the cost of the work, there did not appear to be any special circumstances which would justify an approach being made to the Service Departments with a suggestion that they should vary the recognized practice in such cases.

Mr. Hurd asked if it was not a fact that the Southern Electricity Board had reached agreement with the local residents to proceed with its scheme, and that, through the action of the Air Ministry, the cost of the scheme was increased by some £4,000 or £5,000 by the requirement that some of the cables must be laid underground. Should that not be a charge on public funds rather than upon local residents?

Mr. Robens said there were many occasions when it was necessary to lay underground cables rather than have overhead wires, and in that case it did not seem to be one for intervention by his Department.

### Telephone Equipment

Mr. Joynson-Hicks asked the Minister of Supply what value of telephone exchange equipment was exported to hard and soft currency countries, respectively, in 1948; and what proportion of our total production did this represent?

Mr. G. Strauss said that exports of telephone exchange equipment were not recorded separately. The figures for telephone apparatus of all kinds were: Hard currency markets, £1,130,000; sterling area, £7,250,000; other countries, £3,630,000. These exports represented slightly more than half the total United Kingdom production in 1948.

## Copper Consumption

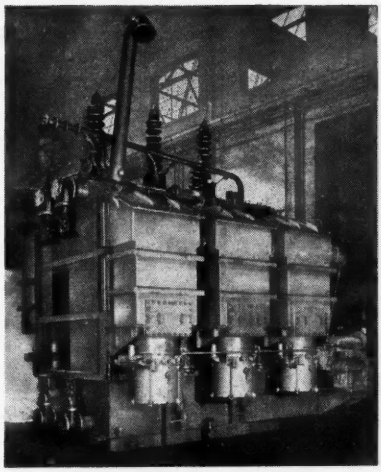
DURING the first quarter of the year consumption of copper for all purposes declined — virgin metal from 94,704 to 90,771 tons and copper and alloy scrap (copper content) from 48,907 to 43,986 tons. An analysis issued by the British Bureau of Non-Ferrous Metal Statistics, 132, Hagley Road, Birmingham, 16, shows, however, that the output of high-conductivity products rose from 54,427 to 58,341 tons. There was a decline from 37,233 to 28,627 tons in the production of alloyed copper rods, bars and sections.

## Power System Load Control

WITH the rapid extension of power systems, combined in-phase and quadrature voltage regulation of reinforcing feeders is required to control the loading of parallel circuits the impedances of which are unequal.

To achieve this end, equipment incorporated with the main transformer so as to form a compact unit is being built by the British Electric Transformer Co., Ltd. A typical 20 MVA, 66/33/33 kV transformer unit supplied to the North Western Board has on-load tap-changing gear for an in-phase regulation of 25 per cent in 1.25 per cent steps, and in a sub-compartment of the main tank incorporates a quadrature booster giving a 20 per cent voltage regulation in sixteen 1.25 per cent steps. It is also possible to vary the phase of the voltage over approximately 11 deg 19 min.

The in-phase tap-changer is of the LS type using an auto-transformer and two diverter switches for each phase to provide the bridging circuit during the transition from one tapping to another. The two single-phase diverter switches are connected in series and oil-immersed in one tank. The diverter switches are designed as oil circuit breakers for dealing with the arc energy released during the making and breaking of the inductive auto-transformer circuit, and are capable of operating repeatedly for long periods without attention. A similar scheme is used for changing the booster tappings, the diverter switches being of identical design.



**20 MVA transformer unit with on-load tap-changing gear and quadrature booster**

## Domestic Electrical Installations

A LARGE number of British Standards of direct interest to those concerned with the design and maintenance of electrical installations are listed in an appendix to the I.E.E. Regulations for the Electrical Equipment of Buildings. With a view to bringing the essential requirements of these together into a convenient form for reference, the British Standards Institution has issued Handbook No. 9—Domestic Electrical Installations, which contains a summary of thirty-six specifications.

The handbook is divided into seven sections as follows:—1, Standards of general application to domestic electrical installations; 2, Conduits and conduit fittings and ducts; 3, Cables; 4, Wiring accessories; 5, Distribution boards, fuses and switchgear; 6, Communications; and 7, Appendix of informative tables (most of which are reproduced from the Regulations for the Electrical Equipment of Buildings).

The technical essentials of the specifications, though summarized, have not been modified, but only those features which are of direct interest to those concerned with the design and maintenance of installations have been included. Copies of the handbook may be obtained from the British Standards Institution, 24, Victoria Street, London, S.W.1, price 12s 6d post free.

### Street Lighting Improvements

SUNDERLAND Town Council is to carry out improvements to street lighting in Roker Avenue and Harbour View at a cost of £2,300.

Estimates are being obtained by the Whitley Bay Urban District Council for electric lighting in Shields Road, Seatonville Road and Earsdon Road.

Ashton-under-Lyne Corporation proposes to install 14 electric lamps at the King George V playing fields and is considering lighting Cedar Park, West End Park and Oxford Street recreation ground. Fluorescent lighting is to be provided on the Crowhill housing estate.

Wandsworth Borough Council is recommended to install sodium lighting in the Parkside area. The estimated cost of the project is £3,210.

## Building Methods

THE first report is now available of the Advisory Council on Building Research and Development, which was appointed in 1947 to advise the Ministry of Works on the modernization of methods of building, including the employment of uncommon materials and more machinery in the construction of houses.

The Advisory Council's main recommendation is that ten houses should be erected on each of fifteen selected sites in order to determine experimentally which types of inexpensive designs, services and equipment are likely to ensure the best living conditions. The proposal is ultimately to build 500 houses in order to discover what economies of cost and time may result from the adoption of non-traditional methods.

Plans are now proceeding for the erection at Twickenham, Middlesex, of a pilot plant for cleaning by pneumatic separation the ash from boilers in power stations for processing into building blocks or use as aggregate for concrete.

The Council recommends that research into house heating as a whole should be given precedure. This report is obtainable from H.M. Stationery Office, price 6d, code No. 70-588.

## Indian Import Trade

STATISTICS of the seaborne trade of India have been issued for the six months ended 30th September last. They exclude the direct foreign trade of Pakistan and include the seaborne trade of India, with Pakistan. Imports of electrical instruments, apparatus and appliances during that period totalled Rs. 4,81,20,000 in value. This figure is about the same as that for the whole of former India during the corresponding period of 1947. The share of the United Kingdom was Rs. 3,76,95,000 and of the United States Rs. 68,09,000. Outstanding items in the total, with the shares of these two leading suppliers are given in the accompanying table.

| Class of Goods | Total Rs. (000) | U.K. Rs. (000) | U.S.A. Rs. (000) |
|---|---|---|---|
| Wires and cables ... | 1,84,55 | 1,70,98 | 12,97 |
| Electric meters ... | 51,66 | 47,57 | — |
| Lighting accessories and fittings ... | 45,54 | 38,54 | — |
| Electric lamps ... | 11,89 | 98 | 1,68 |
| Telegraph and telephone instruments and apparatus ... | 16,77 | 13,33 | — |
| Electro - medical apparatus ... | 13,86 | 2,96 | 8,52 |
| Unenumerated electrical apparatus... | 72,69 | 48,83 | 19,69 |

Wireless apparatus, which is separately classified, was imported to the value of Rs. 40,98,000, far less than in the corresponding period of 1947. The share of the United Kingdom was Rs. 22,13,000 and of the United States Rs. 9,03,000. Electrical machinery of all kinds was imported in 1948 to the value of Rs. 5,99,41,000, the share of the United Kingdom being Rs. 4,19,19,000 and of the United States Rs. 1,35,47,000.

## Trade Marks

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within a month of 27th April:—

VAX. No. B669,139. Class 7. Electric motors (other than motors for land vehicles), electric generators, and parts of all such goods included in Class 7. Also No. B669,140. Class 9. Controlling and regulating apparatus included in Class 9.—Metropolitan-Vickers Electrical Co., Ltd., 1, Kingsway, London, W.C.2.

BYLOCK (design). No. 671,723, and No. 671,724. Class 7. Spraying machines.—Bylock Electric, Ltd., 109, South Street, Ponders End, Middx.

TRUVOX. No. 661,554. Class 9. Electrical instruments and apparatus included in Class 9, 'and scientific apparatus and instruments, none being made wholly or mainly of glass; and wireless sets (complete). Also No. 661,555. Class 11. Installations for lighting, heating, refrigerating and ventilating purposes, but not including lamp shades.—Truvox Engineering Co., Ltd., Truvox House, Exhibition Grounds, Wembley, Middx.

MINI-MASTER. No. 661,830. Class 9. Sound amplifiers, sound recording and sound reproducing instruments and component parts included in Class 9.—Lustraphone, Ltd., 84, Belsize Lane, London, N.W.3.

MICROLINK. No. 668,332. Class 9. Multichannel radio-telephonic combined transmitting and receiving instruments and parts included in Class 9.—The Plessey Co., Ltd., 56, Vicarage Lane, Ilford, Essex.

TUSCON (design). No. B670,885. Class 9. Electric cooking utensils included in Class 9, electric measuring apparatus and instruments, and electric indicator boards.—Saref Exports, Ltd., 1, Devonshire Square, Bishopsgate, London, E.C.2.

HYDROSTRON. No. 670,448. Class 11. Electrically operated installations for softening and purifying water.—Superstat, Ltd., Portsoken House, 155, Minories, London, E.C.3.

## I.E.E. Annual Report

COPIES of the annual report of the Council of the Institution of Electrical Engineers for the session 1948-49 and of the accounts for the year ended 31st December, 1948, to be presented at the annual general meeting on 12th May, can now be obtained by members of the Institution on application to the Secretary.

# Electricity Supply

## Power Plant Contracts : Results of Rural Canvass

DURING the past month contracts have been placed by the British Electricity Authority for generating station, switching and transforming station and transmission equipment amounting in the aggregate to £3,038,363. They include two 180,000 lb/hr boilers for Woolwich generating station (John Thompson Water Tube Boilers, Ltd.); coal handling plant foundations for Brighton "B" station, and foundations, buildings and river works for Littlebrook "C" (Hallaway Bros. (London), Ltd.); structural steelwork for Rye House station (Dawnays, Ltd.); coal handling and storage plant, Rye House (International Combustion, Ltd.); superstructures, Blackwall Point station (Peter Lind & Co., Ltd.); switch house and control room, Accrington station (J. Gerrard & Sons, Ltd.); 3 kV switchgear for auxiliary services, Bankside station (Ferguson, Pailin, Ltd.); turbine house basement and foundations, Carmarthen Bay station (Balfour, Beatty & Co., Ltd.); boiler house superstructure and reinforced concrete work, Hartshead station (Fram Reinforced Concrete Co., Ltd.); and switchhouse superstructure, Agecroft station (M. J. Gleeson, Ltd.).

### Farm Supplies

Reasons for the delay of about 18 months in providing electricity for isolated farms on Glazebury Moss are being sought by Irlam Council from the North Western Electricity Board. In November, 1947, the Lancashire Electric Power Co. applied to the Stretford and District Electricity Board for permission to lay a cable to supply power to ten farms. Since then, it is stated, nothing has been done in this matter.

### Appliance Hire-Purchase

The North Western Electricity Board is shortly to launch a standard hire-purchase scheme for the supply of domestic electrical appliances. It will be applicable to the whole region and will include vacuum cleaners, refrigerators, water-heaters, washing machines, and cookers. Hire-purchase schemes already operated by former electricity undertakings will be continued. The terms for the hire-purchase of an electric cooker are expected to be about £1 9s a quarter for seven years. The Board is also investigating existing schemes for renting apparatus with a view to uniform charges.

### Sodium Lighting at Shipley

A street lighting installation carried out at Hollings Hill, Shipley, comprises thirty-seven "Mazdalux" sodium open lanterns suspended over the roadway from standards fitted with bracket arms and at a spacing of 48 yd between each lantern. The light source employed in each case is a "Mazda" 140 W sodium vapour discharge lamp.

B.T.H. sodium street lighting scheme at Hollings Hill, Shipley

The illumination of the road surface is in the region of 4,650 lumens per 100ft linear.

### Rural Development

Initial work on the largest post-war scheme for rural electrification in this country has now been completed by the Merseyside and North Wales Electricity Board. In February a canvass commenced in those sections selected by the Board for early development, and, as a result, the number of people who desire to be connected has been ascertained. Of the 3,750 premises visited to date, nearly 3,000 have agreed to take a supply of electricity, of which 800 are farms and 90 are public buildings such as chapels, churches, schools, etc.

As a result of this encouraging response, the Board will now proceed with the next step, which will involve negotiations in obtaining statutory consents, wayleaves, etc. It is emphasized that full electrification of all 200 sections involved must neces-

sarily be spread over many years, and the progress reported above refers only to those sections which have been selected for early development. Additional sections will be embarked upon as speedily as the supply of materials and labour permits.

### *Power Station Fumes*

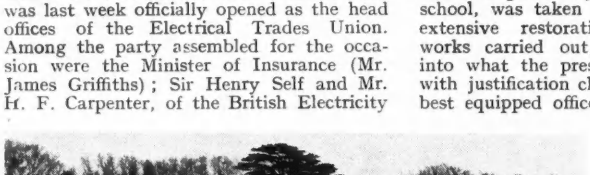
The British Electricity Authority has advised research work by the National Physical Laboratory into problems arising from the emission of smoke and fumes from the Neepsend power station, Sheffield. One suggestion is that chimneys of about 400ft high might carry the emissions over the surrounding hills, but to build one chimney of this height would probably cost from £60,000 to £70,000. At a meeting of the Sheffield Health Committee last week when it was decided to ask the B.E.A. to end the nuisance caused by sulphur fumes and grit from Neepsend and Blackburn Meadows power stations, Mr. J. Law, chief smoke inspector, reported that the average monthly deposit of solid matter in the Wincobank area last year was four times as much as in 1932, while the sulphur content had increased by 56 per cent. Under certain conditions the fumes were so potent that people in the district were compelled to protect their eyes.

### *Electricity Output*

The Ministry of Fuel and Power statement for the week ended 22nd April (which included Easter Monday this year) shows that 692.3 million kWh was sent out for public supply from solid-fuel-fired stations, as compared with 809.5 million kWh in the preceding week and 764.6 million for the week ended 23rd April, 1948.

# New E.T.U. Offices

HAYES COURT, Kent, which is said to have associations with William Pitt, was last week officially opened as the head offices of the Electrical Trades Union. Among the party assembled for the occasion were the Minister of Insurance (Mr. James Griffiths); Sir Henry Self and Mr. H. F. Carpenter, of the British Electricity Authority; between fifty and sixty general secretaries of other trade unions; and representatives of the General Council of the T.U.C., employers' associations, etc.



**Hayes Court, near Bromley, which has been converted into the head offices of the E.T.U.**

This year marks the diamond jubilee of the E.T.U., which started in three rooms at Withy Grove, Manchester. Later it occupied offices at Macaulay Road, Clapham, from which it was bombed out early in the war and then moved to temporary premises at Whaley Bridge in Cheshire. Fifteen months ago Hayes Court, West Common Road, Bromley, Kent, which had been occupied by the Army during the war and had previously been used as a girls' school, was taken over by the union and extensive restoration and improvement works carried out, making the building into what the president, Mr. F. Foulkes, with justification claimed to be one of the best equipped office premises of any similar organization in the country. The light, airy rooms look out on nearly six acres of trim lawns and well-laid-out gardens in the care of a resident gardener and two assistants. Although a more central situation was at first sought, the general secretary, Mr. W. C. Stevens, pointed out that the present site has considerable compensations. The staff, numbering about sixty, are able to work in congenial surroundings with no rush-hour travelling problem, while the offices are within ¾ hour by road or rail from Central London. The total cost of acquisition and reconstruction has been in the neighbourhood of £24,000.

The union has also purchased a convalescent home at Rustington, Sussex, with accommodation for about twenty persons, and Shortlands House Hotel, near Bromley, is being acquired for use as a college for training members of the union as shop stewards, branch secretaries, etc.

# FINANCIAL SECTION

*Company News*
*Stock Exchange Activities*

## Reports and Dividends

**Associated Electrical Industries, Ltd.,** propose to pay a final dividend on the ordinary stock of 10 per cent, less tax, making a total distribution of 15 per cent for the year (unchanged). The consolidated net profit of the group for 1948 (subject to audit) available for appropriation after meeting depreciation, taxation and other provisions and after deducting the proportion attributable to outside shareholders was £2,524,000, as compared with £1,556,530 for 1947

**Switchgear & Cowans, Ltd.**—The annual meeting was held on 29th April, Mr. H. Burroughs (chairman) presiding. In his statement which was issued with the report and accounts, the chairman said that although prices of basic materials still further increased in 1948, the supply and delivery position had improved considerably, enabling them to increase their output by 21 per cent on the 1947 figures. Many new designs were in progress at the present time and the demand for their products was still increasing. The export business, for which they had booked orders during the first three months of this year, already exceeded any year's export business in the past.

**Johnson & Phillips, Ltd.**—An extraordinary meeting will be held on 26th May at which resolutions will be submitted for increasing the capital of the company from £1,067,000 to £1,333,750 by the creation of 266,750 additional ordinary £1 shares. It is proposed to capitalize £266,750 from the profits derived from the nationalization of the company's electricity undertakings and to distribute to shareholders one new share, free of cost, for every four shares held.

**Sangamo Weston, Ltd.,** reports a trading profit for 1948 of £297,372, as compared with £211,607 for 1947 and a net profit of £113,293 (against £76,255). The dividend for the year is maintained at 17½ per cent and £333,974 is carried foward (against £235,841 brought in).

**The British Thermostat Co., Ltd.,** reports profits for 1948-49 of £181,153, as compared with £91,284 for the preceding year. It is proposed to pay a final ordinary dividend of 17½ per cent, less tax, making 25 per cent for the year. For the previous year the total distribution was 23½ per cent, the final dividend being 11 per cent, plus a bonus of 5 per cent.

**Sydney S. Bird, Ltd.,** report a net profit for 1948, including £4,500 provision no longer required, of £9,768, as compared with £20,548 for the previous year. A first and final dividend of 10 per cent has been declared, against two payments of 15 per cent each for 1947.

**The Telegraph Condenser Co., Ltd.,** reports a profit on trading for 1948 of £202,954, as compared with £310,199 for 1947. After providing for depreciation, profits and income tax, etc., it is proposed to pay a final ordinary dividend of 10 per cent, less tax, again making 15 per cent for the year. General reserve receives £60,000 and £43,843 is carried forward (against £41,085 brought in).

**The Ever Ready Co. (Great Britain), Ltd.,** in a preliminary statement, shows a net profit for the year to 28th February last of £537,919, as compared with £531,370 for the eleven months to 28th February, 1948. It is proposed to pay a final ordinary dividend of 25 per cent, making 40 per cent for the year, the same rate as for the previous period.

**G. & J. Weir, Ltd.,** made a public company in 1946, reports a consolidated net surplus of £386,932 for 1948, of which the net profit of the parent company is £280,021, as compared with £165,052 for the preceding year. Reserve receives £175,000, and it is proposed to pay a final dividend of 30 per cent, maintaining the distribution for the year at 40 per cent.

**Marconi International Marine Communication Co., Ltd.**—An issue of £575,000 3½ per cent unsecured notes, 1953-1957, has been placed privately by Lazard Bros. & Co., at the price of £99 per £100.

**The National Electric Construction Co., Ltd.,** is paying an unchanged dividend of 10 per cent for the year.

## New Companies

**Norwich Electrical Co., Ltd.**—Registered 22nd April. Capital £10,000. Electrical engineers and electrical installation contractors, lighting specialists, wireless engineers and service agents, etc. Directors: J. Honeywood, S. F. Lincoln and K. I. Rayment. Regd. office: Service House, 1, Exeter Street, Norwich.

**Adam Hilger, Ltd.**—Registered 21st April. Capital £100. To foster and advance the invention, development and production of scientific instruments in a manner similar to that introduced by Adam Hilger in 1874 and subsequently continued by F. Twyman, F.R.S., as Adam Hilger, Ltd. (the liquidator whereof has consented

to the use of that name by this company). Directors: A. C. G. Menzies (director of Hilger & Watts, Ltd.), Geo. A. Whipple (director of Hilger & Watts, Ltd., and other companies), and Hilger & Watts, Ltd. Regd. office: 48, Addington Square, S.E.5.

**Wm. Gregory (Electrical Installations), Ltd.**—Registered 25th April. Capital £5,000. To acquire the business of W. Gregory carried on at High Street, Sutton-on-Sea, and to carry on the business of manufacturers and repairers of and dealers in electrical and mechanical apparatus and accessories, wireless sets, etc. Directors: W. Gregory and B. K. Storey. Regd. office: 28, High Street, Sutton-on-Sea, Alford, Lincs.

**E. E. Morey, Ltd.**—Registered 27th April. Capital £1,000. To acquire the business of an electrical engineer and contractor, now carried on by E. E. Morey, at 149, St. Margaret's Road, Twickenham. Directors: E. E. Morey and F. Johnston. Regd. office: 149, St. Margaret's Road, Twickenham, Middx.

**Taylor's of Carshalton, Ltd.**—Registered 21st April. Capital £5,000. Manufacturers of and dealers in electrical and mechanical apparatus, accessories and components, particularly wireless sets, radio valves, etc. Directors: H. Taylor and Violet Taylor. Regd. office: 13, The Market, Wrythe Lane, Carshalton.

**Electronics (Enfield), Ltd.**—Registered 7th April. Capital £100. Manufacturers of and dealers in telephonic, telegraphic, electrical, wireless and television apparatus and equipment, sound and picture recording, transmitting and reproducing machines, etc. Directors: L. W. Hope, E. Cousin, H. Sharman and L. J. Lesire. Regd. office: 129, Hampstead Road, N.W.1.

**Multi-Broadcast (Southern), Ltd.**—Registered 14th April. Capital £2,500. Directors: R. A. Hadrill and H. C. F. Finlayson. Regd. office: 4, Broad Street Place, E.C.2.

**R. Lowther, Ltd.**—Registered 14th April. Capital £2,000. To acquire the business carried on by R. Lowther at 8, Paton Street, Manchester; and to carry on the business of manufacturers, repairers and fitters of electrical appliances and devices, radio goods, etc. Directors: R. Lowther and A. Hatton. Regd. office: 8, Paton Street, Manchester.

**Wilson & Green (Television), Ltd.**—Registered 6th April. Capital £300. Directors: E. H. Wilson and P. J. Green. Regd. office: 14, Loseby Lane, Leicester.

**Chase Products (Neon), Ltd.**—Registered 6th April. Capital £100. Manufacturers of and dealers in electrical discharge tubes, X-ray valves and tubes, mercury vapour lamps, fluorescent and other lighting tubes and lamps, wireless and television valves and tubes, etc. Directors A. E. Prior and C. L. Warren. Regd. office: 21, Copthall Avenue, E.C.2.

**Cole-Bernard Productions, Ltd.**—Registered 19th April. Capital £200. Designers, manufacturers, dealers and contractors in and repairers of wireless, recording, amplification and television apparatus, electrical goods and accessories, etc. Directors: B. J. Brown, Mrs. Ruth M. Brown, C. Goode and Mrs. Gertrude Goode. Regd. office: 153, Chiswick High Road, W.4.

## Increases of Capital

**Bastian and Allen, Ltd.**—Increased by £20,000, in £1 ordinary shares, beyond the registered capital of £46,500.

**Cryselco, Ltd.**—Increased by £175,000, in £1 ordinary shares, beyond the registered capital of £15,000.

## Liquidations

**Kalgoorlie Electric Tramways, Ltd.**—Creditors' voluntary winding-up. Meeting 31st May, at 1, Broad Street Place, London, E.C.2, to receive an account of the winding-up by the joint liquidators, Messrs. S. J. S. Eley and A. E. Read.

## Bankruptcies

**E. Whittington,** residing at Haworth Hall, Brinsworth, near Rotherham, and carrying on business as Modern Electric Service at Mona Villa Works, Clifton Lane, Rotherham, manufacturer and electrical engineer.—Receiving order made 20th April on a creditor's petition. First meeting 3rd May, at the Official Receiver's office, 55, Queen Street, Sheffield. Public examination 16th June at the County Court Hall Bank Street, Sheffield.

**R. H. Tuck,** 7, Grand Parade, Upper Richmond Road, London, S.W.14, electrical engineer, and lately carrying on business with another as London Electrical Contractors at 109, Great Russell Street, W.C.1, and at 9, Newman Street, W.1, and also lately carrying on business with another as Brotherton & Tuck, at 9, Newman Street, W.1. First and final dividend of 20s in the £, and 2s 4d in £ on unsecured claims, postponed under Section 63 (1), payable 13th May at Bankruptcy Buildings, Carey Street, London, W.C.2.

**D. H. Mannion,** residing at 129, Blackburn Road, Haslingden, Lancs, electrician, and carrying on business as D. H. Mannion & Son, at 9, Regent Street, Haslingden.—First and final dividend of 2s 2¾d in the £, payable 29th April at the Official Receiver's office, 20, Byrom Street, Manchester. (Amended notice.)

# STOCKS and SHARES

THE course of Stock Exchange markets is running with an unusual degree of smoothness. Apart from a little excitement over specialities, of which Cable & Wireless stocks are one example and Johnson & Phillips shares another, there is comparatively little change on the week. As compared with a month ago, alterations are many, but except in a few cases, of no great consequence. Shares in the "heavy" companies are good, Babcock & Wilcox at 71s 3d being 4s 9d up. Murex, 92s 6d, Electric Construction 55s, British Insulated Callender's 34s 6d, and English Electric 47s 6d are amongst those which have risen 2s 6d since a month ago. The Indian group of industrials is rather harder, owing to more settled conditions. The Delhi Company has called a meeting for 25th May, at which proposals will be put forward to wind up the company voluntarily, the undertaking having been purchased by the Delhi Provincial Government. On Monday in this week dealings started in the new Gas Stock, without this, however, exercising any noticeable effect upon prices in the gilt-edged market. British Electricity threes 102⅞, and British Transport threes 102-3/16, have gone back a trifle.

### Johnson & Phillips

Another sharp rise in Johnson & Phillips lifted the price to 82s 6d. Profit-taking reduced it to 78s 9d, which goes against 71s 6d a few weeks ago. The company proposes to distribute one new share free to holders of every four old shares, capitalizing £266,750. This sum represents almost the whole of the profit which Johnson & Phillips' subsidiaries have made through sagacious management in the past which built up reserves and profits, before nationalization. Under the latter plan, the subsidiaries receive British Electricity Stock to a value which showed a considerable profit over book values.

### A.E.I. Expansion

A million-pound increase was more than the most confident expected from Associated Electrical Industries' 1948 profits (subject to audit). At a net figure of over £2½ million, they exceed the previous results by 62 per cent. The extra goes back into the business: the shareholders' portion is no more than a final distribution, declared wholly as dividend, whereas last year's 10 per cent included 2½ per cent as bonus. The total of 15 per cent is the same, and shareholders can at least feel that the rate is as nearly impregnable as any industrial dividend can be. This is duly recognized in a yield of under 4 per cent on the £1 shares, which, on the results, strengthened to 76s 9d before going ex the final dividend of just over 1s net per share.

### W. T. Henley's Earnings

By hardening to 25s since the issue of the company's profits statement, W. T. Henley's Telegraph Works 5s ordinary shares have rejoined the distinguished band of industrials which yield the buyer a modest 4 per cent on his money. Profits for 1948 are reported to have rather more than maintained the previous year's spectacular expansion. The final distribution of 15 per cent, which brings the year's total up to the usual 20 per cent, is payable this time on capital increased a year ago by the issue of 1,300,000 shares at 21s. On the present ordinary capital of £1,625,000 the latest profits apparently represent earnings of nearly 80 per cent, the surplus being devoted largely to fortifying the already impressive reserves.

### Electric Battery Profits

In view of the Ever Ready Company's good dividend record (40 per cent has been paid on the ordinary since 1939-40) the yield of £5 11s per cent on the 5s shares at 36s appears relatively high, and is generally accounted for by reference to the company's radio interests. There is, however, little evidence, in last week's profits statement, of the difficulties reported this year by most of the manufacturers in that industry, which is, of course, only one of the several fields in which Ever Ready's name is well known. Profits for the year ended last March were still sufficiently above the half-million pound mark to cover the distribution comfortably. The £1 shares of Chloride Electrical Storage, at 96s 3d, were unaffected by the preliminary report and repetition of the 15 per cent distribution.

### Dividends Up and Down

On the strength of virtually doubled profits, British Thermostat are recommending a restrained increase in the ordinary distribution to 25 per cent, as compared with last year's already highly conservative 23½ per cent. The 5s shares improved to 28s 9d. Sydney S. Bird 2s ordinary shares dropped to 2s 6d on the cut in the dividend from 30 to 10 per cent, and on the extent of the profits reduction. Telegraph Condenser's trading profits fell by a third last year, but comparison is with record figures. Reserves are to receive a further substantial appropriation from surplus profits after payment of the 15 per cent dividend. At 35s, the price is 2s 6d higher on the month.

# Electrical Investments

## Past Month's Price Changes

| Company | Dividend Previous | Dividend Last | Middle Price 2nd May 1949 | Month's Rise or Fall | Yield £ s. d. |
|---|---|---|---|---|---|
| *Overseas Electricity Companies* | | | | | |
| Atlas Elec.... ... | Nil | 2 | 13/– | +3d. | 3 1 6 |
| Calcutta Elec. ... | 6† | 6† | 29/– | +1/– | 4 2 9 |
| Cawnpore Elec. ... | 13 | 13 | 36/3 | +½ | 3 11 10 |
| East African Power | 7 | 7 | 38/9 | +6d. | 3 12 4 |
| Jerusalem Elec. ... | 5 | 6 | 20/– | —1/– | — |
| Madras Elec. ... | 8 | 5 | 29/6 | +⅛ | 3 7 10 |
| Nigerian Elec. ... | 12½ | 10 | 31/3 | —4/3 | 6 8 0 |
| Palestine Elec. "A" | 7† | Nil | 32/6 | +1/16 | — |
| Perak Hydro-elec | Nil | Nil | 11/6 | +6d. | — |
| Whitehall Inv. Pref. | — | 6 | 25/– | —1/– | 4 16 0 |
| *Equipment and Manufacturing* | | | | | |
| Aberdare Cables ... | 10 | 15 | 57/6 | —5/6 | 5 4 2 |
| Aron Elec. Ord. ... | 15 | 15 | 43/9 | —1/16 | 6 17 6 |
| Assoc. Elec. Ord. ... | 15 | 15 | 76/3 | +1/16 | 3 18 9 |
| Automatic Tel. & El. | 12½ | 12½ | 62/– | —3/– | 4 0 8 |
| Babcock & Wilcox | 15 | 15 | 71/3 | +4/9 | 4 4 3 |
| Baldwin, H. J. (2/–) | 25 | 25 | 7/9 | —9d. | 6 9 0 |
| British Aluminium | 10 | 10 | 47/– | —3/9 | 4 5 6 |
| B.I. Callender's ... | 6⅝ | 6⅝ | 34/6 | +⅛ | 3 18 0 |
| British Thermostat (5/–) ... ... | 23⅛ | 25 | 28/9 | +1/16 | 4 7 0 |
| British Vac. Cleaner (5/–) ... ... | 20 | 20 | 11/– | —1/– | 9 1 10 |
| Brush Ord. (5/–) ... | — | 10 | 6/3 | —6d. | 8 0 0 |
| Burco (5/–) ... | 35 | 35 | 21/3 | —1/3 | 8 5 2 |
| Chloride El. Storage | 20 | 20 | 96/3 | +1/16 | 4 3 2 |
| Cole, E. K. (5/–) ... | 20 | 22½ | 14/– | —3/– | — |
| Cossor, A. C. (5/–) | Nil | Nil | 7/6 | +6d. | — |
| Crabtree (10/–) ... | 17½ | 17½ | 37/6 | —3/6 | 4 13 4 |
| Crompton Parkinson Ord. (5/–) ... | 22½ | 22½ | 26/6 | +2/– | 4 5 0 |
| De La Rue (5/–) ... | 50 | 50 | 35/9 | +1/16 | 6 19 8 |
| Decca (1/–) ... | 112½ | 112½ | 16/– | —1/– | 7 0 8 |
| E.M.I. (10/–) ... | 6 | 8 | 17/6 | —6 1. | 4 11 5 |
| Electrical Components (5/–) ... | 20 | 20 | 10/9 | —1/9 | 9 6 0 |
| Elec. Construction | 12½ | 12½ | 55/– | +⅛ | 4 11 0 |
| Enfield Cable Ord. | 7⅛ | 7½ | 15/– | —1/– | 4 5 9 |
| English Electric ... | 10 | 10 | 47/6 | +2/6 | 4 4 2 |
| Ericsson Tel. (5/–) | 20† | 20† | 45/– | +3/– | 2 4 6 |
| Ever Ready (5/–) | 40 | 40 | 36/– | —6d. | 5 11 1 |
| Falk Stadelmann ... | 10 | 15 | 45/– | —1/3 | 6 13 4 |
| G.E.C. Ord. ... | 17½ | 17½ | 87/6 | +1/– | 4 0 0 |
| General Cables (5/–) | 50 | 50 | 35/– | —⅛ | 7 2 10 |
| Greenwood & Batley | 15 | 15 | 52/6 | —9d. | 5 14 3 |
| Hackbridge Cable (5/–) ... ... | — | 20(est.) | 15/6 | +9d. | — |
| Hackbridge Hewittic (5/–) ... ... | 6 | 12 | 12/3 | +1/– | 4 18 0 |
| Hall's Tel.Acc.(10/–) | 10 | 10 | 11/3 | —9d. | 8 18 0 |
| Heatrae (2/–) ... | 12½ | 12½ | 5/– | ... | 5 0 0 |
| Henley's (5/–) ... | 20 | 20 | 25/– | +1/6 | 4 0 0 |
| Hoover (5/–) ... | 40 | 40 | 33/9 | —3/9 | 5 18 4 |
| Intl. Combustion (5/–) ... ... | 37½ | 37½ | 43/9 | +1/16 | 4 5 7 |
| Johnson & Phillips | 15 | 15 | 78/9 | +6/9 | 3 16 2 |

| Company | Dividend Previous | Dividend Last | Middle Price 2nd May 1949 | Month's Rise or Fall | Yield £ s. d |
|---|---|---|---|---|---|
| *Equipment and Manufacturing (Continued)* | | | | | |
| Lancashire Dynamo | 22½ | 22½ | 5⅛ | —1/8 | 4 8 0 |
| Laurence, Scott (5/–) | 12½ | 12½ | 13/9 | —1/3 | 4 11 0 |
| London Elec. Wire | 10 | 10 | 46/3 | +1/16 | 4 6 7 |
| J. Lucas ... ... | 17½ | 17½ | 85/– | —5/– | 4 2 4 |
| Mather & Platt ... | 11 | 11 | 50/– | +6d. | 4 8 0 |
| Metal Industries (B) | 10 | 10 | 44/– | +6d. | 4 11 0 |
| Mid. Elec. Mfg. ... | 35 | 35 | 8½ | ... | 4 5 0 |
| Murex ... ... | 20 | 20 | 92/6 | +½ | 4 6 7 |
| Newman Ind. (2/–) | 22½ | 22½ | 5/6 | —9d. | 8 3 6 |
| Oldham & Son (1/–) | 60 | 60 | 10/– | —9d. | 6 0 0 |
| Plessey (5/–) ... | 30 | 20 | 16/3 | —1/– | 6 3 1 |
| Parsons C. A. ... | 12½ | 12½ | 62/6 | —9d. | 4 0 0 |
| Pye Deferred (5/–) | 25 | 25 | 27/6 | —5/– | 4 11 0 |
| Radio & Tel. (2/–) | 40 | 25 | 5/9 | +9d. | 8 14 0 |
| Revo (10/–) ... | 27½ | 27½ | 55/9 | +9d. | 4 19 0 |
| Reyrolle ... ... | 12½ | 12½ | 61/9 | +1/9 | 4 1 0 |
| Scophony (5/–) ... | — | — | 3/– | —6d. | — |
| Scot. Cable (4/–) ... | 30 | 30 | 25/– | —3d. | 4 16 0 |
| Siemens Ord. ... | 7⅛ | 7⅛ | 35/– | —1/– | 4 5 9 |
| Switchgear & Cowans (5/–) ... ... | 20 | 20 | 14/– | +1/– | 7 2 10 |
| T.C.C. (10/–) ... | 15 | 15 | 35/– | +½ | 4 5 9 |
| T.C. & M. ... ... | 10 | 10 | 50/9 | +¼ | 3 18 9 |
| Telephone Mfg. (5/–) | 9 | 9 | 10/– | —6d. | 4 10 0 |
| Thorn Elec. (5/–) ... | 25 | 25 | 18/9 | —1/3 | 6 8 10 |
| Tube Investments | 25 | 25 | 6¾ | +⅛ | 3 18 7 |
| Vactric (5/–) ... | Nil | Nil | 19/6 | +9d. | — |
| Veritys (5/–) ... | 2½ | 5 | 4/– | —3d. | 6 5 0 |
| Walsall Conduits (4/–) ... ... | 70 | 70 | 60/– | +1/16 | 4 13 4 |
| Ward & Goldstone (5/–) ... ... | 50 | 50 | 58/– | —1/6 | 4 6 2 |
| Watford (2/–) ... | 15 | 15 | 6/3 | +3d. | 4 16 0 |
| Westinghouse Brake | 14 | 14 | 68/3 | +2/– | 4 1 10 |
| West, Allen (5/–) | 10 | 10 | 11/3 | +9d. | 4 9 0 |
| *Transport and Communications* | | | | | |
| Anglo-Am. Tel.: Pref. ... ... | 6 | 5⅝ | 110 | +½ | — |
| Def. ... ... | 1½ | 1½* | 17⅛ | +3 | — |
| Anglo-Portuguese | 8 | 8 | 30/– | +6d. | 5 6 8 |
| Brit. Elec. Traction: Def. Ord. ... | 50 | 50 | 1825 | —10 | 2 14 9 |
| Calcutta Trams ... | 10 | Nil | 25/6 | +1/– | — |
| Cape Elec. Trams | 6 | 6 | 22/6 | —2/6 | 5 6 8 |
| Cable & Wireless: 5½ Pref. ... | 5½ | 5½ | 121 | +5 | 4 11 0 |
| Ord. ... ... | 4 | 4 | 224½ | —5½ | — |
| Globe Tel. & Tel.Ord. | 5† | 5† | 44.6 | +6d. | 2 5 0 |
| Great Northern Tel. (£10) ... ... | 12 | 7 | 12½ | —7 | 5 12 0 |
| Inter. Tel. & Tel.... | Nil | Nil | 16 | +1 | — |
| Marconi Marine ... | 7½ | 7½ | 29/– | —6d. | 5 3 5 |
| Oriental Tel. Ord.... | 10 | 16 | 51/3 | +1/16 | 6 5 0 |
| Telephone Props ... | 6 | 6 | 13/9 | —⅛ | 8 14 6 |
| Tele. Rentals (5/–) | 10 | 10 | 10/6 | —3d. | 4 15 3 |

*Dividend postponed.

†Dividends are paid free of Income Tax.

# CONTRACT INFORMATION

## ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK

## Contracts Open

*Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.*

**Edinburgh.**—North of Scotland Hydro-Electric Board. Electrical installations at switching station and plant house, Bearsly.

**Goole.**—23rd May. Town Council. Electrical work in twenty-six houses and twelve flats at Western Road. D. C. Kean, borough surveyor, Municipal Offices.

**Lincolnshire.**—22nd May. County Council. Re-wiring and supplementation of the fire alarm system at the residential establishment, St. George's, Stamford. (29th April.)

**Yorkshire.**—North Riding Standing Joint Committee. Installation of electric lighting and small power services in the new police training establishment, Northallerton. (See this issue.)

## Orders Placed

**Blyth (Northumberland).**—Corporation. Installation of 225 electric radiators, 162 immersion heaters, 81 wash boilers and 81 electric cookers in Council houses.—North-Eastern Electricity Board.

**London.**—CHELSEA.—Electrical installation at Park Walk School—Courtney Pope (Electrical), Ltd.

CAMBERWELL. — Borough Council. Recommended. Installation of fluorescent lighting and repair of existing electrical installations at South London Art Gallery (£774)—Thorn Electrical Industries.

**Middlesex.**—County Education Committee. Recommended. Installation of electric lighting in infants' department of Harrow (Vaughan Road) School (£614)—Colston Electrical Co.

## Contracts in Prospect

*Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.*

**Aberdeen.**—Houses (88), with electrical work, Dyce and Culter; county architect, County Buildings, 25, Union Terrace, Aberdeen.

**Acton.**—Houses (149) and flats (52), Ruislip Gardens estate; borough engineer.

**Alnwick.**—Proposed factory for prefabricated steel buildings; J. A. Teesdale, Bridgeholm, Wetherby, Yorks.

**Bacup.**—Alterations and extensions, Lee Mill, for Gaskell & Co. (Bacup), Ltd.; H. Trickett & Sons, Ltd., builders, Crawshawbooth.

**Blackpool.**—Extensions to brewery; Catterall & Swarbrick's Brewery, Ltd., Talbot Road.

**Bournemouth.**—Extensions, School of Science, Lansdowne Road (£350,000); J. Burton, borough architect.

Primary school, Oakdale; Dorset county architect, Dorchester.

**Brighouse.**—Bungalows, Stoney Lane estate (£11,763); J. Jagger & Sons, Ltd., builders, Bailiffe Bridge.

**Bromsgrove.**—Houses (26), Orchard estate, for U.D.C. (£37,018); S. J. Smith & Co. (Bidford), Ltd., builders, 205, Corporation Street, Birmingham, 4.

**Bury.**—Rebuilding Elton Vale Bleach Works after fire for Joseph Parker & Son, Ltd.; Brierley & Thompson, Ltd., Union Saw Mills.

**Carlisle.**—Technical college, Buckland & Haywood, architects, Norwich Union Chambers, Congreve Street, Birmingham.

**Consett.**—Houses (36), Leadgate, for U.D.C.; C.T.C. (Builders), Ltd., Blackhill, Co. Durham.

**Dorchester.**—Public service vehicle garage, Bridport Road; Bere Regis & District Motor Services, Ltd., West Street, Bere Regis.

**Douglas (I.o.M.).**—Houses (134), Willaston estate; borough engineer.

**Ealing.**—Office block, Uxbridge Road and Woodgrange Avenue; P. H. Caspari, architect, 7, Abercorn Mews, Violet Hill, N.W.8.

**Exeter.**—Houses (195), Stoke Hill and Countess Wear sites; T. Sutcliffe & Son (Contractors), Ltd., builders, 17, Sherbourne Road, Birmingham, 27.

**Glasgow.**—New buildings for Steel Company of Scotland, Ltd.; James Davidson & Son, architects, 6, Academy Street, Coatbridge.

**Gosforth.**—Houses (80) for U.D.C.; Tasker & Child, architects, Trinity Buildings, New Bridge Street, Newcastle-on-Tyne.

**Greenford.**—Plant and vehicle repair and maintenance shops and offices, Ruislip Road; Taylor Woodrow Construction, Ltd., Adrienne Avenue, Southall.

**Greenwich.** — Flats, Springfield estate (£390,000); T. P. Bennett & Son, architects, 43, Bloomsbury Square, W.C.1.

**Grimsby.**—Public abattoir (£80,000); borough engineer.

**Hainault.**—Fire station (£15,500); H. Conolly, Essex county architect, Chelmsford.

**Halifax.**—Houses (185), Moor End Road site; borough engineer.

**Haltemprice.**—Houses (64) for U.D.C.; surveyor, Anlaby House, Anlaby, East Yorks.

**Haydock.**—Bungalows (24), Park Street, for U.D.C.; Winn & Co. (Flixton), Ltd., builders, 8, Delamere Road, Flixton.

**Hemel Hempstead.**—Houses (100) for Development Corporation; Jesse Mead, Ltd., builders, Berkhamsted Road, Chesham.

**Hendon.**—Flats (80), Station Road; A. O. Knight, borough engineer.

**Hereford.**—Generator house and experimental building; Wm. Evans & Co., Ltd., Widemarsh Common.

**Hexham.**—Alterations to form pathological laboratory at the General Hospital; Bird & Co., builders.

**Heysham.**—Congregational church and conference hall, Broadway, for Lancashire Congregational Union; secretary, 244, Deansgate, Manchester.

**Jarrow.**—Factory additions for British Celanese, Ltd.; Middleton & Co., builders, Darlington.

Additions to factory, Bede Trading Estate,

for Abbotts Laboratories; Spence & Price, architects, St. Mary's Place, Newcastle-on-Tyne.

**London.**—HAMMERSMITH.—Five blocks of dwellings, Caroline estate; Kent & Sussex Contractors.

DEPTFORD.—Dwellings (60), Idonia Street (£100,860); Tersons, Ltd., builders, 1, Seward Street, Goswell Road, E.C.1.

BATTERSEA.—Flats (71), Usk Road site, for L.C.C.; Collcutt & Hamp, architects, 126, Wigmore Street, W.1.

SHOREDITCH.—Flats (68), Hyde Road and Harvey Street; borough architect, Town Hall, Old Street, E.C.1.

**Manchester.**—New headquarters for North-West Coal Board, Portland Street; H. S. Fairhurst & Son, architects, 55, Brown Street.

**Merthyr Tydfil.**—Neighbourhood unit of 2,500 dwellings at Gurnos; borough engineer.

**Middlesex.**—Assembly hall, lecture hall and classrooms at Polytechnic, Chiswick, for Middlesex E.C.; county architect, Middlesex House, Vauxhall Bridge Road, S.W.1.

**Mill Hill.**—Single-storey factory building; United Kingdom Optical Co., Ltd., Bittacy Hill.

**Newcastle (Staffs).**—Engineering premises, Friars Street; F. H. Burgess, Ltd., London Road.

Foundry on site near Holditch; J. T. Price & Co., Ltd., founders, Lower Street.

**Northampton.**—Sewage purification works, Great Billing (£340,000); borough engineer.

Shops, offices, etc., Abington Street and Dychurch Lane; Hillier, Parker, May & Rowden, 77, Grosvenor Street, W.1.

**Northumberland.**—Conversion of Ballarat Cottage into maternity and child welfare centre; county architect, Newcastle-on-Tyne.

**Norwich.**—Fourth block of county buildings, Thorpe Road; C. H. Thurston, Norfolk county architect, Norwich.

**Nottingham.**—Fire station, Abbey Street, Dunkirk (£25,000); R. M. Finch, city engineer, Guildhall.

**Oldham.**—Nursery school, Roundthorn estate; Haldean Building Co., Booth Street, Middleton.

**Plymouth.**—Houses (250), Whitleigh estate; city architect.

**Portland.**—Houses (70); B. J. Cornelius, surveyor, Council Offices, Portland, Dorset.

**Portsmouth.**—Dwellings (76), Leigh Park; city architect.

**Queenslie.**—Factory for Scottish Industrial Estates, Ltd.; Geo. A. Boswell & Partners, architects, 256, West George Street, Glasgow.

**Redcar.**—Premises near Lackenby for Cameron & Co., Lion Brewery, West Hartlepool, and near halt railway station for Newcastle Breweries, Ltd., Haymarket, Newcastle-on-Tyne.

**Seacombe.**—New Congregational Church, Rake Lane, for Cheshire Congregational Union; Rev. E. J. Lawson, secretary.

**Sheffield.**—Houses (70), Yew Lane; W. G. Davies, city architect, Town Hall.

**Shotley Bridge.**—Additional nursing accommodation at the Shotley Bridge Hospital; Cackett, Burns Dick & McKellar, architects, 21, Ellison Place, Newcastle-on-Tyne.

**Skipton.**—Houses (29), Colne Road, Glusburn; R. Patrick, builder, Colne Road, Glusburn, near Skipton, Yorks.

**Sunderland.**—Welding sheds for William Doxford & Sons, Ltd.; Brims & Co., Ltd., builders, City Road, Newcastle-on-Tyne.

**Swinton.**—Extensions to Grosvenor Road County School (£83,235); J. Gerrard & Sons, Ltd., builders, Swinton, Manchester.

Additional classrooms at Moorside County School; Taylor & Young, architects, 195, Oxford Road, Manchester, 13.

**Teddington.**—School buildings, Stanley Road Senior School; Geo. Moss & Sons, Ltd., builders, Cranleigh Wharf, Lady Margaret Road, Southall.

**Todmorden.**—Extensions to Portsmouth Mill for Robert Pickles; Wm. Whitham & Sons, builders, 21, Chiltern Avenue, Higher Brunshaw, Burnley.

**Turton.**—County secondary school; Bradshaw, Gass & Hope, architects, 19, Silverwell Street, Bolton.

**Wath-upon-Dearne.**—Extensions to Grammar School (£105,000) for West Riding E.C.; H. Bennett, county architect, Wakefield.

**Westgate-on-Sea.**—Block of flats, Streete Court; J. Clemo & Son, surveyors, 1, Headland Villas, Plymouth.

**West Bromwich.**—Workshops, offices, etc., John Street; F. W. Hearn, 85, Greswold Street.

## Next Week's Events

**Monday, 9th May**

LONDON.—Savoy Place, W.C.2, 6 p.m. I.E.E. Education Discussion Circle. Discussion on "Graphical Methods in Teaching Electrical Engineering (including Radio)." Opened by S. N. Ray.

**Tuesday, 10th May**

CAMBRIDGE.—Cambridgeshire Technical College, 6 p.m. I.E.E. Cambridge Radio Group. "Magnetic Amplifiers," by A. G. Milnes.

LEEDS.—Yorkshire Electricity Board Offices, 6.30 p.m. I.E.E. North Midland Centre. Annual general meeting and visit of President.

**Wednesday, 11th May**

BIRMINGHAM.—James Watt Memorial Institute, 6.45 p.m. I.E.E. South Midland Students' Section. Annual general meeting.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Supply Section. Annual lecture.

Café Royal, 6.30 for 7 p.m. Illuminating Engineering Society. Annual dinner.

I.E.E. London Students' Section, 2.15 p.m. Visit to G.P.O. Research Laboratories, Dollis Hill, N.W.2.

**Thursday, 12th May**

CARDIFF.—Royal Hotel, 12.30 p.m. for 1 p.m. Illuminating Engineering Society (Cardiff Centre). Annual luncheon followed by annual general meeting.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. Institution of Electrical Engineers. Annual general meeting.

**Friday, 13th May**

LONDON.—Caxton Hall, S.W.1, 6.30 p.m. E.P.E.A. Southern Meter Engineers' Group. "Electronic Stabilizers for Precision Measurement," by F. C. Widdis.